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"Domestic Engineering" Wishes You a Merry Christmas

WELL KNOWN EFFICIENCY EXPERT TO WRITE FOR "DOMESTIC ENGINEERING."

"DOMESTIC ENGINEERING" has recently secured as a contributor, a prominent authority on office systematizing and general business efficiency, whose articles will prove of particular interest to master plumbers and fitters, and others in the trade.

H. Whitehead, president of the American School of Business, Boston, Mass., is a true and tried business specialist who has for the past fifteen years, analyzed sales, office and general business problems with remarkable success for many concerns throughout the country, and among which are firms of national prominence.

As an efficiency expert he has had ample experience in many fields of industry and he has been called upon by concerns in a variety of lines to solve riddles in business, and to perfect efficiency systems that made the machinery of the organization run smoother than before.

Recently he has had a good deal of experience in analyzing and infusing new life into the operation of plumbing, heating, hardware and other allied establishments.

We are living today in an age that demands efficiency. Unless the principles of efficiency are observed and adhered to in the conduct of a business, profitable results are unattainable.

We have contracted for a series of articles by Mr. Whitehead, which we believe will prove helpful to our readers. His first article—"Methods of Successful Merchandising for the Plumber"—will appear in the Holiday and Twenty-Fifth Anniversary Number of "Domestic Engineering" which will issue from our presses on December 26th.

In the articles to follow, Mr. Whitehead will discuss accounting methods for master plumbers and fitters, general office efficiency, overhead expense, salesmanship, advertising and publicity, etc.

In a lecture before a body of eastern business men some time ago, Mr. Whitehead gave a list of the mental tools necessary for success in salesmanship.

He said in part: "Thought is the basis of our efforts. Everything must begin with thought. First, the thought, then the plan, then the completed structure. Everything has three existences. The Woolworth Building was first a thought in the mind of its creator, then the plan of the architect, finally the completed building which we see today. The American Beauty Rose is simply the old hedge rose plus—thought. Beethoven's sonatas are simply the seven notes of music—and thought. Shakespeare's plays are simply the twenty-six letters of the alphabet—and thought. You see, therefore, that the first thing is to have a mental equipment of thoughts. The next thing is to apply your thoughts."

Mr. Whitehead has been noted for his painstaking and thorough methods in ferreting out leaks and inefficiency in business procedure.

The trade will find his articles full of inspiration and genuine helpfulness. When Mr. Whitehead talks he says things that hit the mark. The foregoing extract from one of his business lectures proves that he is a live-wire and a man with a message for business men, both great and small.

We believe that the plumbing and heating fraternity will be pleased with Mr. Whitehead's articles which will appear serially in "Domestic Engineering."

Modern Practice in Heating and Ventilation

XVIII.—The Development of the Steam Trap—The Principles Surrounding the Steam Trap, With Practical Illustrations

By ALFRED G. KING

THE action of the expansion steam trap depends upon the varying expansion of metals, chemicals or carbon compound. In a recent article we discussed the float and bucket type of traps. In considering these types first, we did not mean to infer that they were the first style of trap to be manufactured and used, as we believe the expansion type of trap was the first to be employed for handling condensation.

There are many engineers who consider the expansion trap to be inefficient and out of date. This we do not believe as there are thousands of expansion traps sold annually and we have known of expansion traps which have given satisfactory service for years and are yet in use. It is possible that the opinion expressed against the utility of the expansion trap was formed from experience with some of the earlier or oldest types, whose construction had not been perfected to the point of giving continuous, efficient service.

Steam traps are employed to better the efficiency of a heating apparatus by increasing the capacity of the plant. They are used to automatically expel the water of condensation from the steam system, thus keeping the radiating surfaces free of water and effective for heating purposes. Steam traps are also used to drain the condensation from all sorts of steam appliances. We are considering their use more particularly in connection with the heating apparatus and any method used, or appliance installed, which will increase the capacity of the heating apparatus, in an endeavor to secure a maximum amount of heat from a given amount of fuel consumed, will of course add to the efficiency of the installation, and the use of the steam trap has contributed largely to this end.

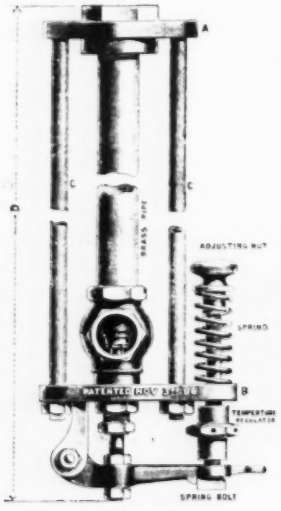


Fig. 1.

Fig. 3.

Expansion traps may be divided into three classes:

a.—Those which are so constructed that their operation depends upon the expansion of a strip of metal or a metal tube or pipe such as the Acton "Old Reliable" trap illustrated by Fig. 1, or the Barton trap illustrated by Fig. 2.

b.—Those which operate by the expansion or contraction of a plug or stick of carbon composition, such as that employed in the Jenkins "Diamond" trap, shown by Fig. 3; and

c.—Those whose action is influenced by the vaporizing and expansion of a volatile liquid confined within a hermetically sealed tube such as the "Heintz" (Figs. 4 and 5), or the "Sarco," illustrated by Fig. 6.

The "Old Reliable" trap (Fig. 1), is one of the oldest types of expansion traps. One end of a piece of brass pipe is held rigid by an iron frame, the end being screwed into a lock nut fastening. On the opposite end of this pipe is screwed a valve, the stem of which is held rigid by the frame and is made adjustable by an arm connecting with an adjusting device. A spring, which is a part of the adjusting device, allows the stem of the valve to move by expansion when pressure is applied to the disc, which is seen on the illustration through the discharge opening of the trap. The extent of this movement is governed or controlled by a temperature regulating device which shortens or lengthens the movement of the spring. Water of condensation flows freely through the pipe and valve until the steam enters; this expands the brass tube moving the seat against the disc and this movement immediately closes the trap. When the water again collects and fills the trap the brass pipe cools and contracts; this opens the valve permitting the discharge of the water.

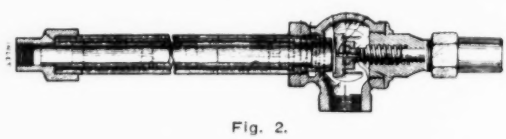


Fig. 2.

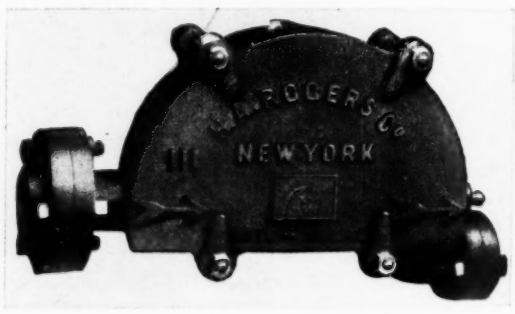


Fig. 4.

The expansion tube of the "Barton" trap, shown by Fig. 2, is somewhat different from that employed in the "Old Reliable" trap. The expansion device of the "Barton" trap is a double tube. The valve seat is attached to the outlet end of the inner tube. The outer tube holds

the shell or body of the valve. The illustration quite clearly shows its construction and the operation of the valve is quite similar to that of the "Old Reliable" trap.

Of those traps which operate by the expansion of a stick or block of composition as illustrated by the Jenkins "Diamond" trap, we may say that they cannot be recommended for high pressure work. On a system where either a low or moderate pressure is used, say 50 or 75 lbs., they work wonderfully well. The "Diamond" trap has only a limited capacity, being manufactured in ½-inch and ¾-inch sizes only. For handling a limited amount of condensation without waste of steam they are very efficient.

Of the traps classified under c, those illustrated are very good examples of this style of construction. The operation of the "Heintz" trap, Fig. 4, is governed entirely by the movement of a crescent shaped hermetically sealed hollow tube spring, which is anchored at one end allowing a free movement of the opposite end. The hollow tube contains the volatile liquid extremely sensitive to variations of temperature. The ends of this tube carry a steel rod or spindle to one end of which is attached a cone-shaped plug or valve disc which, when the tube is expanded, engages with the valve seat closing the trap. This action or movement takes place immediately the steam enters the trap. When the steam condenses the lowering temperature acting on the tube causes it to contract and this movement draws the disc or plug away from the valve seat and opens the outlet of the trap for the passage of the condensation. Fig. 5 shows the interior construction of the trap, the cover of the casing being removed.

The "Sarco" trap, shown by Fig. 6, requires the expansion of a volatile fluid for its operation. The shell of the trap is built in the form of an elongated valve body, which contains a metal casing or cartridge on the interior of which is a flexible corrugated tube, hermetically sealed, containing the volatile liquid, the expansion of which forces the valve head against the seat thus closing the

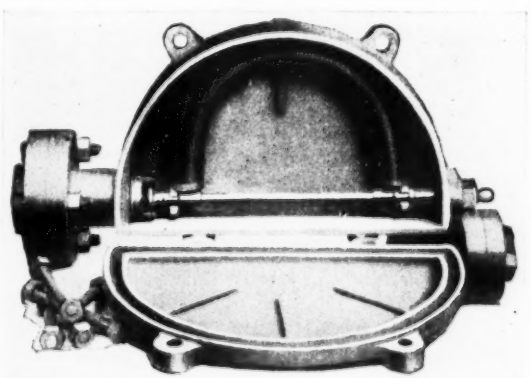


Fig. 5.

trap. When the steam condenses and water collects the liquid cools and contracts and the valve opens. The steam pressure then ejects this water and again closes the trap, this action being repeated as often as there is sufficient condensation to flood the trap.

The thermostatic principle upon which the action of the expansion trap is based is quite the same as that employed in many of the automatic air valves so well known to the trade.

One other class or type of steam trap for handling condensation should be mentioned in connection with those already classified although in no sense operating as an expansion trap, and this type is called a differential trap and works upon the principle of differential water pressure, that is, the difference in pressure due to columns of water of unequal height acting upon the opposite faces of a flat diaphragm, the movement of which controls the action of the valve.

To illustrate this type we shall consider the Flinn differential trap shown by Fig. 7, which is a sectional view through the working parts of the trap.

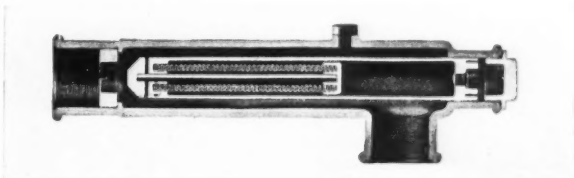


Fig. 6.

As shown by the illustration these parts consist of two wrought iron pipes of different diameters (one being placed inside the other) which connect at the bottom into a hollow casting divided into two compartments with a flexible diaphragm between them.

A by-pass or passage from the outer or larger pipe communicates with the lower compartment on the under side of the diaphragm and the smaller or inner pipe connects with the compartment on the upper side of the diaphragm.

The valve controlling the outlet or discharge of the trap is held in position against the upper side of the diaphragm by a light spiral spring. A small lever for adjusting this spring and for opening the valve is operated by a thumb screw on the exterior of the trap.

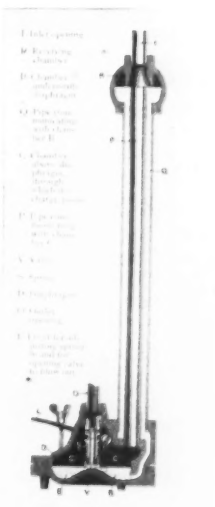


Fig. 7.

At the upper end of the large pipe is a globe-shaped casting which is the receiving chamber of the trap and which distributes the condensation to it. The water of condensation enters the trap at I and flows into the space Q between the two pipes filling the same and communicating through the by-pass with the space of B under the diaphragm filling this space also. When this pipe and compartment are filled the water overflows through the smaller pipe, filling the chamber, C, above the diaphragm in the lower casting. When the inner tube is about half full the pressure upon the upper and lower sides of the diaphragm is equalized and as the water continues to flow into the inner pipe the pressure of the column being downward upon the diaphragm releases or opens the valve and allows the trap to discharge. The discharge is entirely controlled by the quantity of condensation to be ejected, and the temperature of the water or steam has no part in the action of the trap, therefore it will handle the condensation—cold or hot—with equal facility.

LEGAL DECISIONS

Rights of Individual Plumbers.

The Supreme Court of Mississippi says that the defendant in the case of Mayor and Aldermen of City of Vicksburg vs. Mullane, 63 Southern Reporter, 412, was a practical plumber in the city of Vicksburg. He was not a member of a firm nor an executive officer of a corporation engaged in plumbing work. Such work as he obtained he did himself, performing his own labor. He followed his trade for his livelihood. He did not maintain a bureau for the purpose of obtaining contracts. He had no special place of business in which he kept plumbing supplies in order to furnish material to carry out contracts. He was not liable to pay the state privilege before he could do his work as plumber in Vicksburg.

Furthermore, the court holds invalid a city ordinance regulating house sewerage, plumbing, drain laying, and connections with the house sewers in and under the control of the city, and affirms a decree dissolving a temporary injunction restraining the defendant from doing plumbing work specified until he should have complied with the requirements of the ordinance.

The court says that municipalities have the power to adopt reasonable regulations to protect and preserve the property and health of the community. They may enact all proper ordinances to provide and enforce sanitary regulations. Since it is important under present conditions to have the drainage and sewage of public buildings and private residences done with skill and care, the court deems it within the power of the municipality to make all reasonable and appropriate rules for the regulation and supervision of plumbing work. But sanitary measures designed for the protection and preservation of the health and property of a community adopted by a municipality, must be general and equal in their application. The regulations must be uniform. They must not be discriminatory against and in favor of any persons subject to their operation.

Counsel for the city apparently considered the ordinance saved from invalidity, on the grounds of discrimination and inequality, because it provided that the member of a firm or officer of a corporation who stood the examination and got the license should do or superintend the work, using the words in the ordinance, "who will give his personal attention to the work." The court does not think this was so. The provision for personal attention or personal oversight would not answer the objections of inequality, or that the regulation was discriminating in its operation.

Were all the plumbers in Vicksburg treated alike? Were the burdens placed upon them by the regulations equal? Were they all therein granted the equal protection of the law? Was there not a discrimination in favor of firms and corporations, and against plumbers working alone?

It seems to the court that this ordinance imposed special restrictions and burdens on some and granted special privileges to others engaged in the same work in Vicksburg. All the plumbers in that city were not required to stand the examination and incur the expenses of a license fee. This burden was not placed on those working for a corporation where an officer qualified or on a firm where one member procured a license. It was imposed upon those like the defendant, laboring alone, doing his work by his own hands.

If a plumber worked for a firm or corporation, he would not have to comply with the requirements of examination and pay for a license. But he would have to do so if he attempted to work alone. No matter how skilled and competent he might be, he must be under the employment of a firm or a corporation, or he must bear the burden of examinations and expense of fee. A firm or corporation, under the ordinance, might employ plumbers without number who, when so employed, were taken from the operation of the ordinance. Surely this amounted to discrimination against plumbers working alone and in favor of plumbers employed by a corporation or a firm, and also in favor of corporations and firms. Surely this would tend to monopoly.

The defendant was a skilled laborer, doing work very important and, in these days, quite necessary. As such laborer and as a citizen he had rights guaranteed him by the law. Among these was "the preservation of his inalienable rights to labor." Government should protect him in his sacred right to earn his livelihood by working at his trade. It should see that no unequal burdens were imposed upon him, and that there was no discrimination against him because he labored alone. This ordinance did not operate equally upon him and all other plumbers in that city. It was discriminatory as to him.

Representations of Intention or Expectation as to Future Events.

The law is well settled, the Supreme Court of Minnesota says, in Bigelow vs. Barnes, 140 Northwestern Reporter, 1032, that a representation of intention or expectation as to future acts or events, although relied upon and the inducing cause of a contract, is not sufficient ground for the charge of fraud, or for the rescission or repudiation of the contract, merely because the represented act or event did not take place. Such representations are not ordinarily treated as assertions of existing facts, but only of things to occur in the future, and amount to nothing more than mere promises or conjectures of future events, although it has often been held that such representations, where falsely made and with intent to deceive, constitute a fraud entitling the deceived party to his proper redress.

The contract for the heating of the Harvard club on West Forty-fourth Street, New York City, has been awarded to the Child's & Scott Co., while the heating system for the new Yale club is being installed by Baker, Smith & Co. The latter firm is also completing the heating contract for the new Transit building at 5th Avenue and 37th Street, for the estate of Robert Goelet. Also the new Central Branch Y. M. C. A. structure at Fort Greene Place, Brooklyn.

Mrs. Knagg.—"If you don't promise to treat me better I'll go back to my mother."

Mr. Knagg.—"Out of consideration for your mother I'll promise anything."—The Chicago Daily News.

Theory and Application of Centrifugal Fans

Valuable Information About the Practical Installation of Centrifugal Fans, Making Complex Points Clear

By CHARLES L. HUBBARD

(Continued)

Fan Tests.

In the tests referred to at the beginning of the article, the apparatus was arranged as shown in Fig. 8. Readings of the two gauges were taken first with the outlet C wide open and then with 10 per cent reductions until it was entirely closed. The peripheral velocity pressure for the given size and speed of fan was computed by means of formula (1), and the velocity pressure obtained in each case by subtracting the static from the dynamic pressure as read from the gauges A and B.

In the discussion which follows we will first consider the case with the outlet wide open, which represents a fan discharging into free air, and then show what corrections are necessary to adapt the results to actual working conditions. Within the usual range of working speeds, and with the outlet C wide open, it was found that the ratio $\frac{P}{p}$ was constant, having a value of very nearly 0.43 in all cases. P and p being the air velocity pressure and the peripheral velocity pressure respectively. It has already been stated that $Q = 66\sqrt{h}$ represents the relation between pressure difference and resulting velocity for all general conditions. Solving for the value of h, or the Pressure in the above, we have

$$Q = 66\sqrt{h} \text{ or}$$

$$\frac{Q}{66} = \sqrt{h} \text{ or}$$

$$(2)\ \left(\frac{Q}{66}\right)^2 = h$$

Then if,

p = peripheral velocity pressure,
v = peripheral velocity,
P = air velocity pressure,
V = air velocity,

we may substitute these in the general formula (2) and write

$$(3)\ p = \left(\frac{v}{66}\right)^2$$

$$\text{and } (4)\ P = \left(\frac{V}{66}\right)^2$$

The tests referred to, showed that $\frac{P}{p} = 0.43$, or substituting the values of p and P from (3) and (4) we have,

$$\frac{\left(\frac{V}{66}\right)^2}{\left(\frac{66}{v}\right)^2} = 0.43, \text{ or } \frac{\frac{V}{66}}{\frac{v}{66}} = \sqrt{0.43}, \text{ or}$$

$$\frac{V}{v} = \sqrt{0.43}, \text{ or } \frac{V}{v} = 0.65, \text{ or}$$

(5) V = 0.65 v. That is, knowing the peripheral velocity of the fan, the velocity of air flow through the discharge outlet may be found by multiplying this by 0.65. This, of course, only applies strictly to fans of the exact proportions tested, but for all practical purposes will be sufficiently accurate for all fans of this type where the width (W) of the wheel is 0.52 of the diameter, and the discharge outlet has an area equal to a square, the sides of which are 2 inches greater than the width of the wheel, all of which is approximately true for the average fan of standard

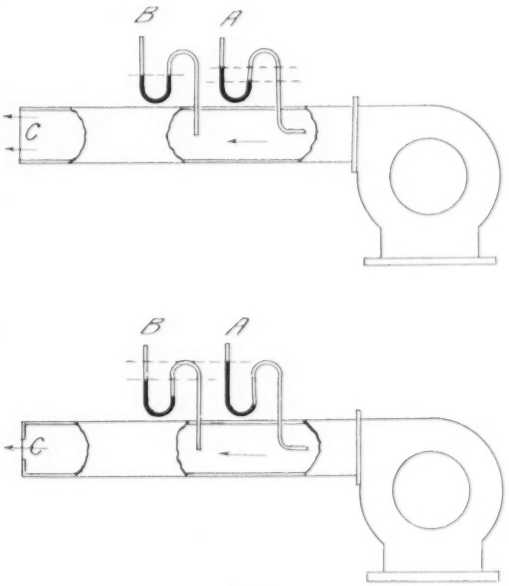


Fig. 8.

make. Placing the results of the above computations in a single formula, we have,

(6) F = 0.65 C R A, in which,

F = volume of air delivered by fan, in cubic feet per minute,
C = circumference of fan wheel, in feet,
R = revolutions per minute,
A = area of discharge outlet, in square feet.

Table I gives data in convenient form for use with formula (6).

Table I.

Diameter of Fan	Circumference	Area of Outlet
2½ ft.	7.8 ft.	2.1 sq. ft.
3 "	9.4 "	2.9 " "
3½ "	11.0 "	3.9 " "
4 "	12.5 "	5.0 " "
4½ "	14.1 "	6.2 " "
5 "	15.7 "	7.6 " "
5½ "	17.3 "	9.1 " "
6 "	18.8 "	10.7 " "
7 "	22.0 "	14.4 " "
8 "	25.1 "	18.6 " "
9 "	28.3 "	23.4 " "
10 "	31.4 "	28.7 " "

Example (1). What volume of air will be delivered by an 8-foot fan running at a speed of 100 r. p. m.?

$$F = 0.65 \times 25.1 \times 100 \times 18.6 = 30,373 \text{ cu. ft.}$$

Effect of Resistance.

As previously stated, the particular test upon which this formula is based was made with the fan discharging into

free air with practically no resistance. When connected with a system of ventilating ducts a resistance is introduced which has the same effect as partially closing the fan outlet, that is, reducing the velocity pressure, and consequently the volume of air delivered. In other tests it was found that when the outlet of the fan was partially closed the volume of air was reduced in the same proportion. For example, if the area of the outlet was reduced 25 per cent. the volume of air delivered was only 75 per cent of that at full opening, and so on. When determining the size and speed of fan for any given case it is necessary to estimate the probable resistance in equivalent reduction of outlet area. There is no reliable way of computing this, and it can only be estimated after considerable experience. It has been found, however, for average conditions where shallow heaters are used, not over 8 or 10 pipes deep, and where the air velocity in the ducts is not over 800 to 1,000 feet per minute (conditions generally found in schools, churches, halls, etc.), that the resistance is equivalent to reducing the fan outlet about 20 per cent. For factories and similar buildings, where heaters from 15 to 20 pipes deep are employed and where the air velocities run as high as 1,800 to 2,000 feet per minute, the reduction will amount to 30 or 40 per cent.

Hence, for the first class of buildings, use formula (6) and take 80 per cent of the result for the actual fan capacity, and for the second class, take only 60 to 70 per cent of the result given for a discharge into free air. These factors are for average conditions, and will be found in most cases to give results closely approximating those obtained in practice. For special requirements, such changes may be made as the experience of the engineer has shown to be necessary.

Speed.

In making computations for capacity, care must be taken not to exceed a certain peripheral velocity on account of the noise produced by the fan. Although the efficiency increases up to a peripheral velocity of about 8,000 feet per minute, velocities of about 3,500 should not usually be exceeded where quiet running is essential. In factories and shops, where this is not important, higher velocities, up to 5,000 or 6,000 feet per minute may be used.

In a general way the volume of air delivered by a fan varies directly as the speed, and the power as the cube of the speed, or in other words, doubling the speed will cause the fan to move twice as much air, but it will require $2 \times 2 \times 2 = 8$ times as much power to drive it.

This increase in power only applies approximately to the actual fan, as it does not take into account the efficiency, which increases with the speed up to a peripheral velocity of about 8,000 feet per minute when discharging into free air. It is true, however, that the power increases much more rapidly than the volume of air moved when the speed is increased, and this should always be taken into account when speeding up a fan to increase its capacity is under consideration.

Other Methods of Determining Fan Capacity.

In fan catalogues tables are commonly given stating the volume of air delivered by fans, operating under different pressures, usually expressed in ounces per square inch. Furthermore, the terms effective area of outlet, blast area, capacity area, etc., are often mentioned in connection with the operation of centrifugal fans.

It is proposed to explain this method briefly and to compare the results obtained with the method already given. When the discharge opening from a fan casing is of comparatively small size, and is operating under a free delivery into the atmosphere, the velocity of outflow will be practically the same as the tips of the blades, or in other words, the peripheral velocity.

The pressure spoken of in connection with the catalogues is the pressure corresponding to the peripheral velocity, as computed approximately by the formula $Q = 66 \sqrt{h}$, the pressure h being in ounces per square inch in this case. Values for corresponding velocities and pressures, computed by a similar, but more accurate formula, are given in Table II.

Table II.

Velocity, in feet per minute.	Corresponding pressure in oz. per sq. in.
2,585	¼
3,165	⅜
3,653	½
4,084	⅝
4,472	¾
4,829	⅞
5,161	1
5,768	1¼

Blast Area.

It has been stated that when the discharge opening is small, the air will pass out at a velocity equal to that of

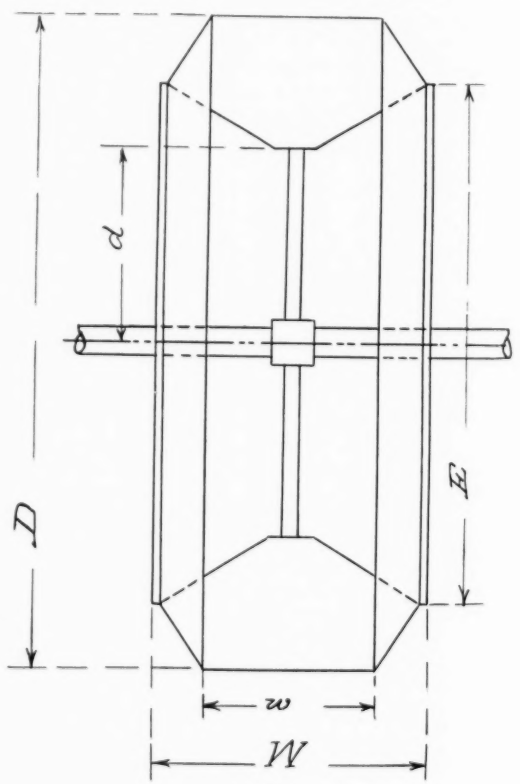


Fig. 9.

the peripheral velocity of the fan. Now if the area of opening be slowly increased, while the speed of the fan remains constant, the air will continue to flow at the same velocity until a certain size is reached. From this point on the outflow will become less than the peripheral velocity, the difference between the two becoming greater as the discharge opening is increased.

The effective area of outlet at the point when this change begins to take place is called the blast area or capacity area of the fan. While this will vary somewhat, in fans of different makes, it will not vary much from $\frac{Dw}{3}$ for the ordinary blower of standard type, D being the

diameter of the fan wheel, and w the width at the circumference as shown in Fig. 9.

If all fans were made with the discharge outlet equal to the blast area it would be a simple matter to compute the capacity of the fan, being the product of the blast area multiplied by the peripheral velocity of the wheel.

As a matter of fact, certain corrections must be made to offset various practical considerations. First, the outlet of the fan casing is always made larger than the blast area which causes the velocity of outflow to fall below the peripheral velocity, and second, when air passes through the outlet of the fan, the stream is contracted somewhat, so that the full area cannot be used when computing the capacity. With the usual form of outlet, the sectional area of the contracted stream of air is about 0.8 that of the area of the outlet. This factor, 0.8, is called the *coefficient of discharge*, and the actual area of the fan outlet multiplied by this, is called the *effective* area. Assuming the blast area to be $\frac{Dw}{3}$, and taking w as 0.8 W, and substituting for W its equivalent, 0.52 D, we have for the blast area, $A = D \times 0.8 \times 0.52 \times 0.33 = 0.14\ D^2$.

The figures given in Table III are computed on this basis and will be found convenient for reference.

Table III.

Diameter of Fan.	Blast Area.
3 ft.	1.26 sq. ft.
3½ ft.	1.72 sq. ft.
4 ft.	2.24 sq. ft.
4½ ft.	2.84 sq. ft.
5 ft.	3.50 sq. ft.
6 ft.	5.04 sq. ft.
7 ft.	6.86 sq. ft.
8 ft.	8.96 sq. ft.
9 ft.	11.34 sq. ft.
10 ft.	14.00 sq. ft.

The discharge outlet varies somewhat for fans of the same diameter, when different makes are compared, but on the average it will not be far from 2.2 times the blast one, as given in Table III.

Assuming a coefficient of discharge of 0.8, it gives the effective area as $0.8 \times 2.3 = 1.84$ times the blast area.

A series of tests made at the Massachusetts Institute of Technology some years ago on a centrifugal fan, showed that with a discharge area equal to approximately 1.84 times the blast area, the pressure producing the flow through the fan outlet was about 0.7 of that computed from the peripheral velocity by the formula $Q = 66\sqrt{h}$.

If increasing the effective outlet to 1.84 times the blast area causes the pressure to drop to 0.7, that due to the peripheral velocity, we must, in order to again bring the pressure up to its original point, increase the velocity of the fan tips to a speed given by the equation:

$$Q = 66\sqrt{\frac{h}{0.7}}$$

Assuming the original pressure (h) to be 1, we have $Q = 66\sqrt{\frac{1}{0.7}} = 1.2$. That is, the fan speed must be increased 1.2 times in order to overcome the effect of increasing the effective outlet over that of the blast area as stated above.

Having this data at hand, it is a simple matter to construct a rule for determining the capacity of a fan under actual conditions, discharging into free air.

First assume a peripheral velocity according to the type of building, which for schools, churches, etc., may be taken as 3,165 feet per minute, which for the theoretical conditions given in Table II, corresponds to a pressure of ⅜ ounce. Then multiply the blast area from Table III, by 1.84 to find the effective outlet area of fan. This multiplied by the peripheral velocity in feet per minute (from Table II) will give the volume of air discharged per minute in cubic feet.

To find the speed, take the revolutions per minute from Table IV corresponding to the diameter of fan and the given pressure (⅜ ounce in this case), and multiply this by 1.2 to find the actual speed.

Table IV.

Dia. of fan.	Revolutions per minute.							
	¼ oz.	⅜ oz.	½ oz.	⅝ oz.	¾ oz.	⅞ oz.	1 oz.	1¼ oz.
3	328	403	465	531	570	615	657	734
3½	282	345	398	446	488	526	562	630
4	247	302	349	390	427	460	493	550
4½	219	268	309	346	379	410	438	489
5	196	242	278	312	342	369	394	440
6	164	201	232	260	285	307	328	367
7	140	172	199	223	243	264	282	314
8	123	151	175	195	213	230	246	276
9	110	134	154	172	189	205	219	244
10	98	121	139	156	170	184	197	220

Example—(2): What volume of air in cubic feet per minute will be delivered in free air by a 7-foot fan working under a pressure of ⅜-ounce pressure, and what will be the required speed?

Using the above method, we have $6.86 \times 1.84 \times 3,165 = 39,942$ or 40,000 cu. ft., in round numbers; speed of fan $172 \times 1.2 = 206$ r. p. m.

Let us now work the same example by the first method and see how the results compare. Taking the formula $F = 0.65\ C\ R\ A$ and substituting the proper values, we have $F = 0.65 \times 22 \times 206 \times 14.4 = 42,400$ cu. ft., in round numbers, a difference of approximately 2,400, or $\frac{2,400}{42,000} =$ .05 + or, 5 per cent, which is fairly close for two entirely different methods based upon different tests and assumptions.

Mr. H. C. Russell gives the following formula for the capacity of centrifugal fans discharging into free air (Metal Worker, Jan. 21, 1911):

C. F. M. $= 0.4 \times K \times D^3 \times N$, in which,

C. F. M. = cubic feet of air discharged per minute.

K = 1.57 for free suction and delivery.

D = diameter of fan wheel, in feet.

N = revolutions of fan per minute.

Applying this to the same example as above, we have C. F. M. $= 0.4 \times 1.57 \times (7 \times 7 \times 7) \times 206 = 43,807$ cubic feet, which is slightly more than that given by the other methods, although very close for work of this kind.

It would seem, therefore, that the method based on the tests furnished by the American Blower Co., and given in formula (6), is a fair average of the three methods described.

For "Sirocco" fans (one of the multivane types) Mr. Russell gives the following:

C. F. M. $= 1.96 \times D^3 \times N$ for free delivery.

All of these cases refer to a fan working in free air and must be corrected for the duct resistances, according to the type of building, as already described.

(To be continued.)

A young fellow, the son of a wealthy man, was engaged in some clerical capacity by a friend of his father, in order to try to make something of him. He was, however, shiftless to the last degree and nothing he said could be relied upon.

One day his employer called him into his private office and gave him a sound lecture. He dwelt chiefly on his prevarication and wound up by saying:

"You know, James, that you are always lying."

"Sir," said James, "I would have you remember that I am a gentleman!"

"There you go again," said his employer.—The Chicago Daily News.

How Service May Be the Right Arm of Success

Address Delivered at the Annual Meeting of the Eastern Supply Association, Held in New York City, Oct. 14, 1914

By GUILFORD R. ADAMS, of Samuel Sloan & Co., Rochester, N. Y.

RECENTLY, I received from a friend a quarter page of a Boston paper, with an article headed, "Service —The Inspiration of Today." Nearly half the clipping was taken up by a picture. This showed a young man standing in front of his desk, coat off, sleeves rolled up, a letter in his hand. He appears to be gazing over the desk where, in the background, can be seen in dim outlines, a radiant temple marked "Service."

Back of him and beside him, are the shadowy forms of the great of this earth—painters; poets, musicians, explorers, and, nearest to him, the tall figure of Abraham Lincoln.

Each one of these great men is pointing with an outstretched arm to this temple of "Service."

Among other things, this article says: "The mighty inspirations of other days, all had the single purpose of Service: Emancipator, Discoverer, Musician, Poet and Artist; all are immortal for what they could give mankind and not for what they could get. Each from his high ideals, expressed the single thing worth expressing —in his own way—through his own medium—and each spelled 'Service.'

"What does your business mean to you? What do you bring to it? Have you ever said to yourself, 'This is my work, and I'm going to stick to it while life sticks to me?' If you have, you are thinking most of what you can bring to your business—how much of brains and energy, of high ideals and inspirations you can give it.

"And, if you give your best to business, business will give its best to you. More and more, men are beginning to realize there is no essential difference between the inspiration that prompts one man to write a noble musical composition, and that leads another to paint a splendid picture. All inspiration is the same—to serve is the one true aim of all inspiration, and he who serves through business is as great as he who serves in other ways. The memory of all the great—whether the Artist, the Poet, the Discoverer or the Emancipator—today should be the inspiration of the American business man. They urge him to follow their ideal, 'Service.'"

One day last spring, I sat with a number of other business men, at a dinner meeting of the Wholesale Trade Committee of our Chamber of Commerce.

Opposite me, sat a gentleman who, over a year before, had been induced to leave Brooklyn and take charge of the affairs of one of our largest wholesale grocers.

The conversation drifted to state of trade, and one of our party asked this gentleman, "How is business? Are you selling many groceries these days?" Like a shot from a gun came the reply, "Groceries? Why, we are not selling groceries—we are selling Service!"

Another wholesale grocer said, "That's right; since you came to Rochester we hear a lot more about the Service you are giving than the prices you are making!"

At my home we were recently comparing the Service of three local department stores. One was always prompt, always kept its promises to deliver, even if it meant sending a special messenger; another could only occasionally be depended on, and from the other, one never expected goods to be delivered until at least twenty-four hours after being purchased.

It is not hard to guess which firm secures most of our trade, or which store we recommend to our friends.

The noon hour is not always the best for shopping, but one often finds it convenient for small purchases.

One noon, recently, I wanted to make a small purchase and, on my way to dinner, stopped at the nearest hardware store.

This store is long, narrow and, at the time I was in, but one clerk was at the front counter waiting on three customers while in the distance, another clerk could be seen at the back of the store waiting on other parties.

Seeing that a long wait was before me, I crossed the street to another store—a large, square one—fine fixtures, admirable arrangement, several clerks; each one busy with customers in the various corners of the store—but no one in the center square, where I knew the article I wanted was kept. No one spoke to me, and I soon drifted out and went around the corner to a much smaller store.

Here I was met at the door by a floorwalker—directed to the proper counter, got my small package, paid my bill, and in one minute after I entered the store, was on my way home.

The next time I want to purchase hardware, and my time is limited, which store will I be apt to go to first? They are all first-class stores, but "time is money."

The pleasant greeting and hearty "Thank you" from each of the clerks of the United Cigar Stores to every purchaser has meant thousands of additional dollars of dividends to its stockholders. It is part of their creed and is good business.

A few years ago, jobbers of plumbers' supplies were few and far between, sales were made to far distant points, and the plumber expected that, after ordering goods, there would be quite a delay in receiving them.

In this hustling age, the plumber who is in need of material often calls another jobber, when he finds that the telephone lines of the jobber he intended to favor are busy.

When the question is discussed of how soon the material is to be sent, the jobber is informed that the goods are wanted, not tomorrow, or next week, but now.

We cannot blame the plumber, for he has much at stake; his workmen are high-priced men, and contracts are often taken on close margins.

The jobber who can give Service by promptly delivering the complete order at the agreed time and place, is the one who next time often gets the first chance to fill similar orders.

So today, with the increased number of jobbers, more and more the distribution of our line is becoming localized and, to my mind, Service is the greatest factor in the continued existence of the jobber of plumbing supplies.

Each year, the items used in installing plumbing or heating in the modern residence, are more and more diversified. The matter of freight and cartage or express on small lots sent direct to the plumber by the manufacturer is, in itself, a slight protection to the local job-

ber. In some cases, this amounts to 10 or 15 per cent on the purchase price, but being a separate item, is often not considered by the plumber in comparing prices.

What manufacturer, except in the line of plumbers' brass goods, has found it profitable to market his goods direct to the plumbing fraternity? (Even such manufacturers, these days, are having hard work to make sales—it's a pick-up market this year!)

One line after another has tried selling direct, and many are the losses they have had.

How much better off the manufacturer would have been to have given a fair differential to the jobber, and let him distribute his products, rather than have tried to distribute them himself!

A local jobber is, naturally, better able to watch credits, and can guard his interests, much more easily than a distant manufacturer.

The subject of my talk has been stated as "Some Ways by which Service may become the Right Arm of 'Success.'"

For fear that I may wander from my subject, I will place before you a card marked at its top "Success," and place below this, small cards showing the way Service may assist Success.

These will be added one by one as the various subjects are taken up. The first card, you will see, is marked

System.

You cannot give Service without system; system in buying, system in selling, system in receiving and system in shipping; but don't expect system to run your business! Many corporations and branch houses fail to succeed, because their owners expect system to take the place of personality, and prices to take the place of kindly interest in the customers' welfare.

If every employe worked as if the business were his own, how few mistakes would be made, and how little time and material would be wasted!

Make your customer feel that your store is his warehouse, and encourage him to freely tell you if you lack some items that he needs from day to day, or even occasionally.

If you ask his judgment before putting in new lines, it will help to interest him in the goods, if his decision is in their favor. On the other hand, if the practical plumber doesn't want the goods, why tie up your capital in the line?

System in examining invoices will result in many a dollar saved.

Several years ago, a pipe mill sent us, at our request, a credit memorandum for an overcharge of over $1,700, caused by a misplaced decimal point in the gross amount of a bill for a carload of pipe. Thus, it pays to examine every invoice minutely, as well as to check in material carefully.

On your purchases, be as prompt to report undercharges as overcharges.

There is only one route to the City of Success and that is via the Square Line Railroad.

It is better to have the reputation of being square, than to be known as a millionaire.

It pays to watch your stock records for changes in demand.

One of my partners, Mr. Wm. Sloan, has his wrought pipe sales so systematized that he can tell how many feet of any size was sold from stock each week, each month, or any year for the past ten years.

A few days ago he told me that our sales on one size of pipe, formerly used largely for gasfitting, was 35,000 feet less last month than the same month in 1909. Electric lighting supplanting gas lighting, seemed the only answer, as each year, for five years, the demand has been falling off for this and smaller sizes.

In a conversation with a jobber one day, he said: "I am sick of the shortages on orders we ship. I don't mean the odds and ends, seldom called for, but such items as 1-inch cast elbows, ½-inch plugs, etc."

My remedy would be a close analysis of sales, and a good reserve stock of the most salable items. For instance, we carry in stock a total of 22 sizes of malleable unions, covering black and galvanized. Out of these 22 sizes 66⅔ per cent of our total average sales for the past

Guilford R. Adams, Who Has Been Connected With Samuel Sloan & Co., of Rochester, N. Y., for More Than One-Third of a Century.

seven years are made up by two sizes. We, therefore, always carry a good big stock of these two particular sizes.

Take cast iron elbows, of which we carry altogether 54 sizes of 90 degree elbows, straight and reduced. I find that 80 per cent in numbers of total sales, is made up of only five sizes of the 54.

Of regular galvanized elbows, straight and reduced, plain and beaded, we carry 50 sizes, yet 60 per cent of the total tonnage of elbows is composed of two sizes of ells—plain and beaded—or four of the 50 styles and sizes.

Illustrating this point of knowing which items are safest to carry in stock in fair quantities, one day a friend of mine called to talk over a jobber's stock of goods he contemplated buying. He told me what their inventory cost was, and the price at which he could buy the stock.

I asked him if it was a well-balanced stock, and he laughed and said that it was large at both ends and small in the middle; plenty of 4 and 6-foot bathtubs, but no 5-

foot; lots of small and large one-piece enameled sinks, but no 20x30 size; loads of pipe, but no ½-inch or ¾-inch galvanized.

As he expressed it, "I will have to spend a good many thousand dollars to fill in this stock, to enable me to make any sort of satisfactory shipments to my customers."

My advice was, not to buy the stock unless he could buy it very cheap and then, only provided he could raise the cash to even up the stock, and still have a good working capital in reserve.

I have read somewhere this quotation: "The storerooms of innumerable failures are choked with unsalable stocks of stuff unsuited to the possible market or for which all demand has faded away."

Have you ever examined the inventory of a bankrupt jobber of plumbers' supplies? To the buyer, such an experience is a help to future decisions or purchases.

Have you looked over the odds and ends, lead pipe stops and bibbs that should have been sold for old metal long ago, the lines of goods all of us get caught on occasionally, by smooth salesmen, who tell you how large a demand there is to be for them, which demand never materializes?

The bankers these days talk a lot of quick assets and clean inventories. Should we not, as jobbers, realize that if a good share of our capital is tied up in slow-selling styles and sizes, we cannot give our customers Service on the quick-selling lines? Keep your stock full of quick assets and low on deadwood.

Economy.

Centuries ago, Seneca wrote: "Economy is in itself a source of great revenue," while Franklin said: "If you know how to spend less than you get, you have the Philosopher's Stone."

With sales only three-quarters of normal, the jobbers in our line are, this year more than ever, scanning their expense accounts. Let "Economy" be the watchword, from the porter to the heads of the firm, and you will be surprised at the outcome. It is said, "It pays to advertise;" it also pays to save.

If you can impress on your customer that your prompt Service in caring for his wants, enables him to save time and money, you may depend on more frequent orders from him.

It seems to me that, in these times of close margins, if you don't take your cash discounts, your creditors will take you.

Discounting your bills is good business, even if you have to borrow money to do this. Insist that any freight allowance due you should be deducted from the face of the invoice. This will, in many ways, save you both time and money.

Reciprocity.

The question may be asked: "How does this subject relate to 'Service?'" I hope I may be able to convince you that it does.

Years ago, I was at a convention, with many jobbers present, and our departed president, Henry Aird, used the words, "My customer" in his remarks.

Another jobber objected to this phrase, saying that no one could, in these days of keen competition,, truthfully say, "My customer."

A young jobber spoke up and said: "I agree with Mr. Aird. He has, in one case at least, a perfect right to say, 'My customer,' and my reasons are as follows:

"I have a friend in the plumbing business, in the eastern part of the state, who told me this incident of his own experience:

"It seems that this plumber was rather heavily indebted to Aird-Don Co., when the only bank in his home town failed. Not only were his own savings wiped out, but also the funds of many of his customers. He did not know what he could do, for he had some good-sized contracts only partly completed. The next morning, Mr. Henry Aird read the news of the failure in his paper and, without delay, took the first train to this village. Looking up the plumber, he said, 'I am very sorry to hear of your trouble, but don't let it worry you. Order of us everything you need and your orders will be filled. I am sure you will, eventually, pay every cent you owe.' This assurance was just what the plumber needed, and he ordered carefully, for immediate requirements. A few months afterwards the bank reopened its doors and paid its depositors in full. You may rest assured that the first check this plumber drew on this bank was in favor of Aird-Don Co. That jobbing house had been loyal to him and he has been loyal to them ever since. He is certainly Aird-Don Co.'s customer and should always remain so."

This is true reciprocity!

"Do you wonder," said this young jobber, "that I never ask my plumber friend for any of his business?"

I feel that I am taking too much of your time, but want to tell you another incident along these same lines:

One day I was on my way from Pittsburgh to Washington, sitting alone in the smoking compartment, when a young man came in.

We soon became acquainted and he told me of some experiences he had had as a dry goods salesman.

One afternoon he boarded a train at Harrisburg, found a seat and soon was engrossed in an interesting magazine. Glancing up as the train started, he saw an old gentleman standing, as all of the seats were filled. In an instant he was on his feet, gave up his seat to him and stood himself, for an hour or more. Later, the car became less crowded and the salesman and the old man were seated together. Soon the salesman was questioned as to his business, as to whom he sold in various towns, and finally, he was asked if he sold a certain firm in a village in western Pennsylvania. His answer was, "No, I have never been able to sell them. I know I could do them some good, but they, so far, are wedded to another jobber. However, I call on them every trip and, some day, I hope, I may be able to sell them."

The salesman soon after left the train and started hustling for business.

A few days later he was in the town in western Pennsylvania that the old gentleman had referred to and, true to his principles, called on the firm that had never given him an order.

This store was run by two brothers, who had been quite successful in their business.

Standing talking to them, he glanced toward the back of the store and, sitting at the desk, was his old friend of the train and, as he afterwards learned, this man was the father of these brothers and the largest stockholder in the company.

Their eyes met, and the old gentleman hastened forward, took the salesman by the hand, and said to his sons, "This is the gentleman who was so kind to me the other day and gave up his seat to me on the train! Now, all things being equal, I want you to give him the preference in your purchases."

That was five years ago and, while the old man is now dead, "That same firm is my largest customer today," said the salesman.

You may say this acquiring a new customer was simply a coincidence. I do not agree with you. The salesman was a true salesman, for he combined kindness and un-

selfishness with his everyday life, so that it became second nature, and he, in due time, received his reward.

A jobber once said to me, "My best boosters are the plumbers' helpers. You never know how much good they can do you, and some day, they will be the plumbers of your city. If there is a chance for a doubt as to an error being blamed on them, I take the blame myself, and also see that they are given carfare when they have to come back to change such goods."

Value.

Sometimes we purchase goods that are like the cakes I saw the other morning. Glancing in the window as I entered a restaurant for breakfast, I saw two elaborate cakes—as fine work as I have ever seen in pastry.

When the waitress came for my order, I said: "I see you have the wedding cakes all right! Which one of you girls is to be married?" She replied: "Wedding cake, nothing! Say they are just tin pans covered with frosting—there is nothing in them."

Have you ever bought any plumbing supplies, expecting to make a fair margin of profit and find out later "there is nothing in them?"

In a book called, "How to Run a Store at a Profit," I recently read the following:

"Every cent saved in shortened value is lost in shortened trade. To keep up the sales, keep up the quality! Aim first to sell satisfaction, and the goods that give it will resell themselves!"

You cannot give Service without Value. Stick to lines you know are staple and don't shift for a passing change of price. Things will even themselves up and a stock of mixed makes is an abomination to the plumber.

Pay as much attention to quality as you do to price, and closely inspect all goods received. It is sometimes easier to adjust differences before the goods are accepted and paid for, than afterwards.

Try to get good value. Try to give good value. Remember this one of the four rules for success that Andrew Carnegie says are fundamental for manufacturers: "Subject all products to more rigid tests than purchaser requires. A reputation for producing the best is a sure foundation upon which to build."

Industry.

Lowell has written, "No man is born into this world whose work is not born with him. There is always work and tools to work with for those who will, and blessed are the horny hands of toil."

Some one has said that the secret of Edison's success was persistency, more persistency and then more persistency.

You hear a lot these days of efficiency experts. We hear of moving pictures being taken of workmen at their machines and later, having them see themselves upon the screen as others see them.

In this way, the tendency is to cut out all unnecessary motions and make every stroke tell. By this, service becomes good service, and rough places are made smooth.

Character.

If I live until the fifth of next month, I will have completed a third of a century in this line of labor. I am proud of the fact that I came up from the ranks of workers through all my degrees in hard work.

As I look back over the past, my first decade in business life was most influenced by that prince of men, Samuel Sloan, whose memory I revere.

A memorial from this organization, dated September 9, 1903, which was sent to Mr. Wm. Sloan, soon after the death of his father, has a prominent place in our office, under a life-like portrait of the founder of our business Among other things, it truthfully says:

"Samuel Sloan was a man of most exemplary character. He was a type of the self-made man, obtaining the full measure of success through integrity and perseverance.

"'This was a nature like a tree,
Men sought its shade instinctively.'"

I remember reading recently, "Let us not say, every man is the architect of his own fortune, but let us rather say, every man is the architect of his own character."

John B. Gough says of character: "A man is what he is, not what men say he is. His character is what he is before God; that no man can touch, only he himself can damage it. His reputation is what men say he is—that may be damaged. Reputation is for time; character is for eternity."

Froude says, "You cannot dream yourself into a character, you must hammer and forge one for yourself."

If all the means to successful service are made use of, that we have so far enumerated, from System to Industry, and you lack Character, your work is in vain.

I asked a credit man how he rated character in opening an account, and he said that, with him, character was the first requisite for credit.

Another credit man said he would call financial ability "A," while character would be "B." I think in his heart he meant to reverse the order, for later, he told me he had cut out the drink habit years before, and, he said, "To say nothing about my health, this has been worth a hundred thousand dollars to me since that time."

Feeling that way, character must loom up big in his estimate of a man's worth, and I doubt if a man addicted to drink gets much of a line of credit from him, even if he has financial ability.

Enthusiasm.

And the last of these is Enthusiasm—the joy of the work, the love of the game, the receiving or giving the well-earned "Good work—that was a fine sale," or "that was a good purchase," as the case may be; the joy of feeling that you are doing something to make homes more sanitary, more beautiful and safe for little children to play in, is worth all the effort, all the hard work you put into it; the feeling that those you employ are well paid, well housed and happy and contented in their work, is a great compensation.

I trust you will pardon the length of this paper. As I have been writing it, it has grown upon me, and, no doubt, long before this, you have noticed that the red capitals at the beginning of each word were put there for a purpose. You have probably been spelling the word "Service" as I have been speaking. Let me repeat them:

S ystem
E conomy
R eciprocity
V alue
I dustry
C haracter
E nthusiasm

All are ways by which Service may become the Right Arm of Success.

In closing, I want to leave with you the words of that noted lecturer, Theodore Parker: "Let us do our duty in our shop or our kitchen, in the market, the street, the office, the school, the home, just as faithfully as if we stood in the front rank of some great battle, and knew that victory for mankind depended on our bravery, strength and skill. When we do that, the humblest of us will be serving in that great army that achieves the welfare of the world."

Questions and Answers

A SMALL HOT WATER HEATING PLANT.

Editor "Domestic Engineering":—The sketch shown herewith is for a small hot water heating plant, which I am about to install. The boiler room is on the same floor as the radiator, and it is impossible to set the boiler in a pit.

It is desired that the radiator be set on the floor and not on brackets. The boiler is also to supply hot water

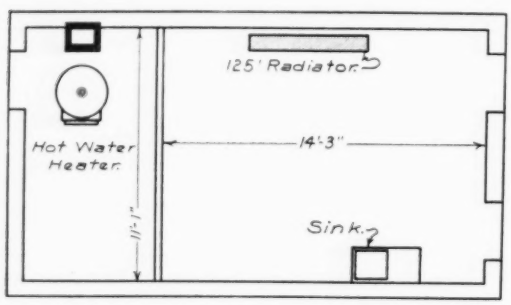


Fig. 1.

to a sink without the use of a range boiler. The water pressure is 60 lb. Will it be necessary to install a water pressure regulator and an expansion tank on this job?

Albion, Mich. G. B.

Fig. 1 is a reproduction of the sketch submitted on which is indicated the location of the hot water heater, radiator and sink, referred to in the communication .

We would not advise the installation of this work without the use of a tank. Drawing hot water at the sink will quickly reduce the temperature of the water in circulation owing to the fact that there is no surplus storage of hot water; and again, if the hot water heater is of a

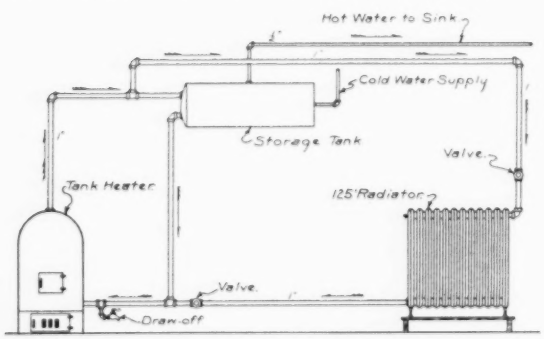


Fig. 2.

generous size, or if it is allowed to heat up more than ordinarily a dangerous pressure will accumulate which can only be cared for by the installation of a safety valve on the system.

We advocate the use of a storage tank—say of about 60 gallons capacity, which can be suspended by iron straps from the ceiling on the right hand side of the boiler in the boiler room. The water is constantly circulating through this tank providing sufficient storage so that the heating system is not affected when hot water is drawn at the sink. The tank could be set vertically on a stand or on feet if desired.

We submit a sketch (Fig. 2), showing how the pipe connections may be made and their size. We would recommend that valves be placed on the flow and return lines to the radiator in order that the circulation to it may be cut off when not required or so that it may be removed without interfering with the storage system.

Correspondent states that the radiator is to set on the floor without brackets. The water will circulate through the radiator if placed on the floor, but it will give better service if raised slightly on a radiator board or pedestal as indicated in Fig. 2.

The installation of an expansion tank will not be necessary with the system arranged as shown by our sketch, as the job is a pressure job. If, however, correspondent dispenses with the storage tank it will be necessary to use an automatic expansion tank.

A pressure regulator will not be required.

HEATING BOILER ON HIGHER LEVEL THAN RADIATORS.

Editor "Domestic Engineering":—I would like to get some information about a hot water heating system which I have just completed. Every radiator on the system heats in the proper manner except three in the basement.

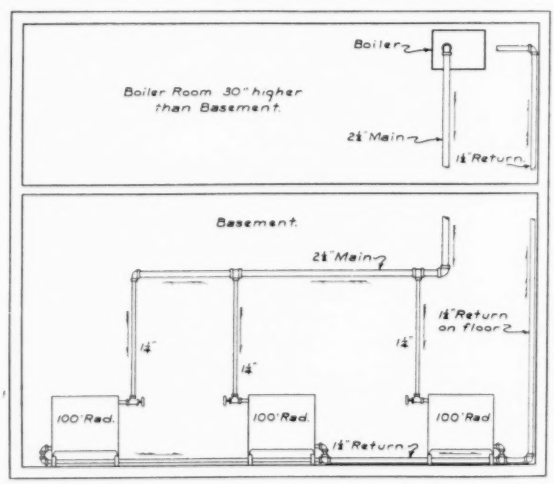


Fig. 1.

I ran a separate line from the boiler to these radiators, each connected with 1¼-inch pipe to the main, which is 2½-inch.

I would like to know if I could force the circulation by taking a 1¼-inch supply to the third floor from each radiator with air vent on the third floor and then return to the same radiator.

Portage, Pa. P. H. P.

It is quite impossible to obtain a good circulation through radiators when they are located on the same floor as the boiler unless they are fed with supply pipes which are taken to a sufficient height to give the necessary motive power to move the water in the radiators and establish a circulation through them.

The sketch submitted by correspondent as we understand his drawing, showing location of boiler and radi-

ators, is shown by Fig. 1. We note that the boiler room is 30 inches higher than the basement of the building. This is a bad condition as the entire radiation in the basement, as well as considerable of the piping is trapped from 30 inches to 36 inches below the return opening of the

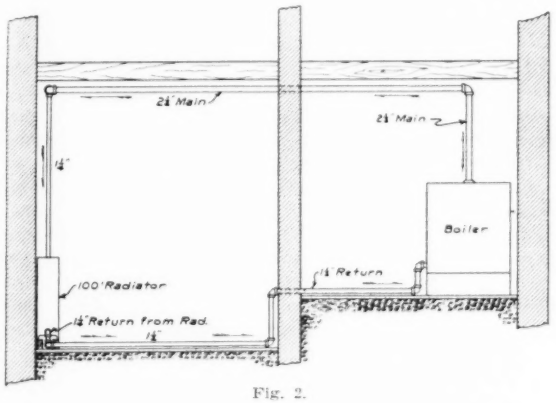


Fig. 2.

boiler and will therefore require a considerable weight of the water above them in order to establish a circulation. Fig. 2 shows an elevation of this job as we understand this condition.

Either of the two methods may be followed in installing this work. The drop supply pipes serving the

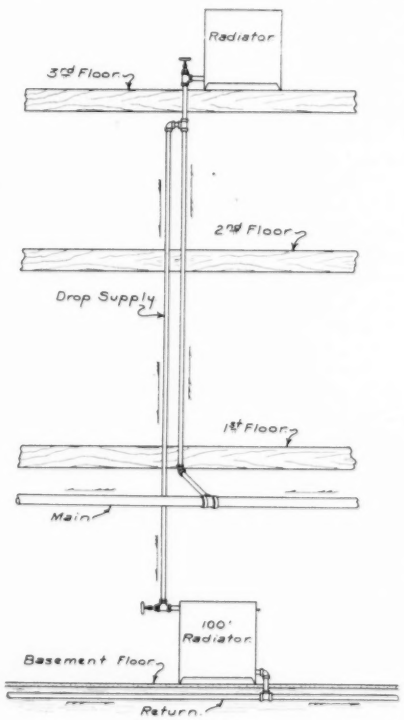


Fig. 3.

basement radiators may be taken from the flow risers to radiators on the upper floors as illustrated by Fig. 3, in which event the riser should be increased to a generous size, or the piping may be installed as for the overhead system as shown by Fig. 4, either of which will work satisfactorily provided the flow is sufficiently high to give the pressure necessary to establish the circulation. The illustrations are intended to show the two methods, and these must be adapted to the conditions found on the work.

If the overhead method is adopted (and we prefer this method) the highest point of the piping should be at

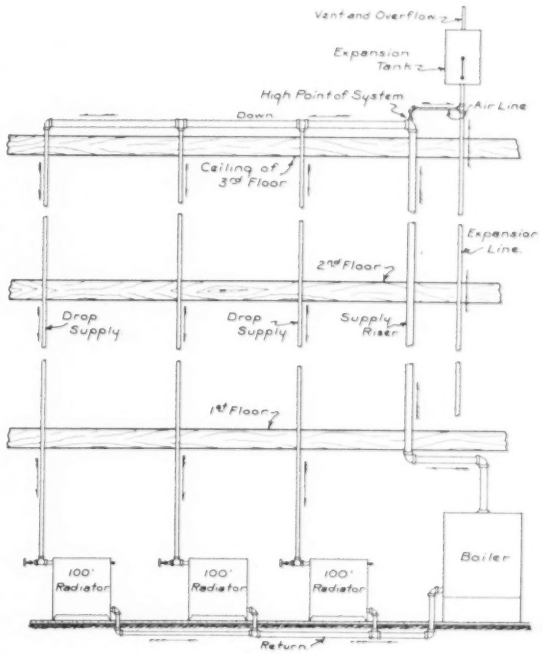


Fig. 4.

the top of the main riser, and from this point the expansion line leading to the tank should be connected or, provided there are other radiators connected to the system and the expansion line leads to the basement, a vent connection may be made from the top of the main riser to the expansion line leading to the tank as shown by Fig. 4. In the latter case the vent pipe should have an upward pitch from the top of the riser to the point where connection is made to the expansion line.

The overhead main should pitch down from the high point. It should be 2½ inches in size until the first branch is connected. It should then be reduced to 2 inches and continue this size until the second branch is taken off and then reduced to 1½ inches and continue to the end of the line. The return should be of the same size as the flow.

WHY SOME RANGE BOILERS COLLAPSE.

Editor "Domestic Engineering":—Will you kindly explain just what is the cause of the collapse of a range boiler?

St. Louis, Mo. Worker.

The cause of collapse of a range boiler is the formation of a vacuum inside of it. If the boiler is sufficiently strong the forming of a vacuum will not result in its collapse, but some boilers are not strong enough to withstand the strain.

Atmospheric pressure is about 15 lbs. per square inch, and when all inner pressure is gone, as is the case with a vacuum, there is nothing to withstand the crushing force of the atmosphere, except the resistance of the boiler itself.

A SICK HEATING JOB.

Editor "Domestic Engineering":—The accompanying sketch shows a steam coil, which I have installed in a building, with the result that the pipe nearest the floor will not heat properly, while the other three pipes heat

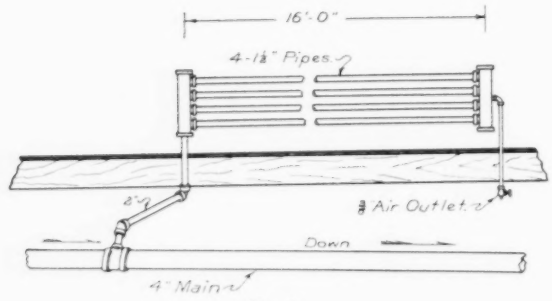


Fig. 1.

in the most perfect manner. This is, as you will notice, a one pipe steam job, and instead of using an automatic air valve, I am using a ⅜-inch pet cock and keep it half turned on to release the air out of the coil.

Will you kindly tell me how I can cure this job?

Milwaukee, Wis. Subscriber.

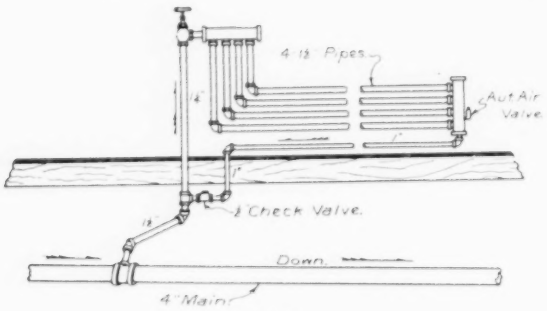


Fig. 2.

The pipe coil shown by Subscriber's sketch (Fig. 1) is not properly constructed or connected.

Pipe coils to be used for steam should be constructed with a mitre or with return bends to properly provide for expansion. Pipe coils are, as a rule, connected two-pipe;

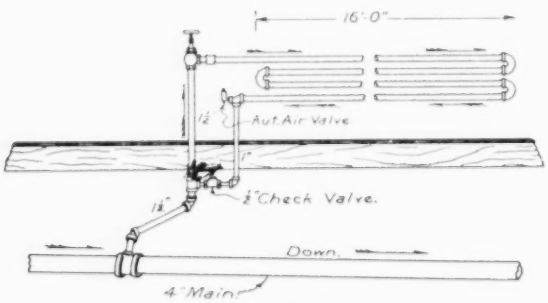


Fig. 3.

they may, however, be connected (both flow and return) to a single riser and thus the coil is virtually connected one-pipe—the riser acting as both flow and return. Fig. 2 illustrates a mitre coil and Fig. 3 a return bend coil connected in this manner. Note that a common swing check valve is used on the ½-inch horizontal return pipe connecting to the riser and that this connection is reduced in size. This reduction is made in order to flood the check valve and to provide a sufficient head of water back of it to open the clapper to allow the condensation to pass through the valve. For this purpose also it is best to drop the return through the floor before making the connection to the riser and we have found it to be good practice to file away and lighten the clapper of the check valve so that a slight pressure of the water in the return will open it for the passage of the condensation.

A coil of the size shown—four 1½-inch pipes 16 feet long—contains, in the piping and manifolds, approximately 35 sq. ft. of radiation, and a 1½-inch branch from the main with a 1¼-inch riser and valve, is ample size for good service.

The air valve may be placed in the basement on the 1-inch return if it is desired to locate it in this position. We think, however, that it should be placed on the coil in the position indicated in the illustrations, Figs. 2 and 3, and that it should be an air valve of the automatic type.

THE CAPACITIES OF PIPE.

Editor "Domestic Engineering":—Occasionally I wish to know the capacity of a line of pipe, and would therefore appreciate it if you would publish a table that would give this information.

Wilkes-Barre, Pa. Piper.

When the capacity of one foot of pipe of any given size is known, it is a simple matter to find the capacity of the entire line by multiplying the capacity of 1 ft. by the number of feet.

Example—What is the capacity in gallons of 215 ft. of 3 in. pipe?

From the table below, it is seen that 1 ft. of 3 in. pipe contains .367 gal. From the rule, the total capacity of 215 ft. = .367 × 215 = 79 gals.

Table of Pipe Capacities.

Size of Pipe	Gallons per Foot
½ inch	.01
¾ inch	.02
1 inch	.04
1¼ inch	.063
1½ inch	.09
2 inch	.163
2½ inch	.255
3 inch	.367
3½ inch	.6
4 inch	.652
4½ inch	.825
5 inch	1.42
6 inch	1.46

Steve Miller, a plumber of Crawfordsville, Ind., in a recent advertisement, stated: "The only kind of plumbing that you can afford is good plumbing. Half way jobs put in by incompetent plumbers are the most expensive in the long run. Place your plumbing contracts with a man who has a good past record for satisfactory work. It's a 'Safety First' provision."

Dodging Responsibility.

"Yes," said Mr. Growcher; "I intend to keep up the idea of Santa Claus in my family as long as possible."

"What for."

"I don't want the children to blame me when they don't get just the presents they were looking for."—Washington Star.

Sidelights on Men in the Trade

A Three Term Legislator

THE industrious citizens of Fargo, N. D., were eagerly scanning the local newspapers. With a thrill of expectation and interest they observed that the candidate of their choice had been elected by a large plurality to a seat in the state legislature of North Dakota. The man whom they had known as a thriving business man in the plumbing and heating field and whom they knew as a friend and a neighbor, had been chosen to represent them as a lawmaker. That was in 1907.

For three terms he served his constituents in the chambers of the state house. He acquitted himself well, for he proved a veritable legislative watchdog. He introduced and secured the passage of laws (the first in the West) compelling the ventilating of public buildings and the proper installation of plumbing, etc. He introduced a bill for the creation of a state inspector of plumbing. He championed it strenuously, but after a closely contested fight it was defeated.

The limelight of the political arena did not fascinate this gentleman of plumberdom, and he longed to get back into the harness of business again. And so upon his withdrawal from legislative duties after the expiration of his third term, one of his first moves was to organize the master plumbers and steamfitters of the state. For three terms he served them as president of the organization, and afterwards as national state vice-president. Although his name was Price he was undoubtedly a price-less man to the plumbers and fitters of the state. W. J., for this is the plumber-legislator's initials, was born at Stockton, England, in 1868. In his native town he flourished under the name of Bill, Will, Willie and William—and sometimes as Wilhelm when he happened to meet Teutonic folks.

After the death of his father who was killed in an accident, he came to the U. S. A., at the tender age of ten, traveling alone with his eight-year-old cousin. Young Price's destination was Pittsburgh, Pa., where he was placed in charge of relatives.

When he reached the age of fourteen, he was indentured as an apprentice to the Halpin-Kennedy Company, a Pittsburgh plumbing and heating concern, known today as the Stinson-Kennedy Company. For nearly five years he served at the trade, the first two of which he received the munificent salary of $2.50 a week.

Finishing his apprenticeship at the age of eighteen, he came to Chicago in 1888 and went to work as a journeyman for Hugh Watt, one of the old time North Side master plumbers. After two years in the employ of Watt he journeyed westward. He worked at the trade in many cities, including Des Moines, Seattle and Spokane, etc. Following two years of service at the plumbing game in the West, he steered for Fargo, N. D., where he began business for himself and where he made a real "go" of it. As the president of the Fargo Plumbing and Heating Company he remained in Fargo for twenty years.

Mr. Price came to Chicago about three years ago, after disposing of his business in Fargo. He became identified with the Consolidated Engineering Co., of Chicago, manufacturers of heating specialties, and was elected vice-president. In 1913 he disposed of his interest in the concern and resigned, after which he organized the Price-Murphy Co., heating, ventilating and plumbing contractors of Chicago.

This transplanted citizen of North Dakota is today one of the aggressive, efficient and well-known men in the trade in the West. During his thirty years' experience in the plumbing and heating business, he has learned all the fine practical points about the profession and he can "deliver the goods" from A to Z.

Socially and personally he has a host of friends in and out of the trade. In Masonic circles he has a wide acquaintance, being a member of all the Masonic bodies. He is also a Past Exalted Ruler of the Elks, Lodge No. 260, Fargo, N. D. In clubdom he is well known as a member of the Illinois Athletic Club of Chicago.

Mr. Price has few hobbies. His strongest fort is fishing, a pastime he cultivates during the summer months, when the pressure of business is not too keen. His bass and trout adventures evoke gasps of wonderment from those of his friends who are disciples of Isaac Walton. His fish stories are not "fishy," for he has snapshot photos to substantiate his statements. That's proof enough for any skeptic.

The Gladstone Heating & Plumbing Co., Gladstone, Mich., has moved to Anderson Building, 808 Delta Avenue, having outgrown its old quarters. Gladstone is located in the northern part of Michigan, and although reports have been heard for many months to the effect that that particular section of the state was "standing still" owing to the dullness of the mining industries, the Gladstone Heating & Plumbing Co. has been going ahead, which is evidenced by the need of larger quarters.

F. O. Baldwin, formerly of Monroe City, Mo., has recently opened a plumbing shop in the Swap Building, on Spring Street, Boonville, Mo.

Business Methods for the Plumber and Fitter

XXV.—How Specializing in the Plumbing and Heating Business Makes for Economy and Special Skill

By WESLEY A. FINK

THE chief advantages of specializing are economy of skill, economy of machinery and tools, and economy of materials. In an establishment doing miscellaneous jobbing, where the workmen are performing every day a large number of miscellaneous duties, now a little of this, then a little of that, it is difficult or impossible to measure the achievements of the several workmen so employed, bring them to a scale, and assign credit or blame according as each is found to have done more or less in a given time.

Now, if we take the case of a contractor installing the plumbing in a row of small houses, the different portions of the work can be classified, into drain-work, roughing-in work, setting bath room fixtures, toilet down stairs, kitchen and laundry fixtures, etc., and records of the time spent on each section can be kept and tabulated, so that for estimating purposes you have almost an exact record of what to allow on future bidding, you also have records for comparing performances of present and past workmen, so that the skilled or slothful workers can be determined, and if piece work or premium rates are made to stimulate production, such scales can be made that are fair both to employer and employee.

In the struggle for commercial supremacy, the desire and ambition of all who are at the head of any business enterprise is a maximum production at a minimum cost. Not only is labor from time to time seeking larger wages per day, but the tendency of the raw material market is upward, and the increased costs can only be offset by either higher selling prices or an increased production.

Much of the work in the jobbing shop that is done by the highest priced help, in the specialized shop can be done by cheaper labor. In many lines, competition is so severe as almost to eliminate the possibility of securing an increase in the prices, so that any equalization in profit must be brought about by a reduction in the costs and through an increase in production.

If the business manager would remember the time and money spent on each job or part of a job each day for the year, he would be entirely independent of cost accounting records; but as this is impossible he must depend upon a system of accounts and records to meet existing conditions. The measure of his success is not merely dependent upon his securing the maximum production, but he must secure a maximum production at a minimum cost and he must have proper accounting data and records to help him in the reduction of the costs of production.

If the cost of a complete job or contract is compared with a previous cost and is found excessive, the business manager should immediately want to know where the increase is, as well as what caused it, and unless a proper accounting system has been introduced, showing the cost of each part or section of the job, and the amount of materials used in each, it will be next to an impossibility to locate the trouble. Without definite information the increase cannot be located because of the inability to tell whether the roughing in or finishing work, or delays to non-arrival of material on time, or too much material consumed caused it. The words, "the cost is too high," can be passed from the boss to his foreman, and from him to the workmen; but the workmen may know as much about what caused this high cost as they do about astronomy, so that no good is really accomplished.

By checking up each section of a job or contract the manager can tell with certainty whether the increase in cost is a legitimate one or not, and while some may argue that there is no use in crying over spilled milk, there is such a thing as trying to prevent the recurrence of the accident. Unless the minor increases and their causes are located it is impossible to reduce costs. Intelligent workmen desire to retain their positions and will be anxious to try and wipe out any increases. If, however, they do not care—and there are some workmen of this stamp—the comparative cost records will weed them out in time. Any system that will enable the business man to pass upon the efficiency of his workmen is a system that he should welcome, as it embodies one of the essentials of cost reduction. When new workmen are engaged, if a record is kept of their work for a short time and compared with that turned out by former workmen, their efficiency or inefficiency can soon be determined.

Comparative cost records are valuable also for deciding the question of whether better tools or more efficient equipment, or different methods of handling work, would be instrumental in reducing costs all along the line. The time necessary to secure and compile the costs of the different jobs and contracts, and their separate sections is not as great as one would suppose, if the system has been carefully devised to meet the existing conditions and the clerks each day record all the data secured the previous day.

The small jobbing plumber is placed under a great disadvantage by the growing variety and expensiveness of machinery and tools, and he must therefore have many things done by hand or by imperfect tools or machinery, though he knows how to have them done better and cheaper by special machinery or tools, if only he could find constant employment for them. But in the large shops specializing on certain lines of work the machinery and tools will be well up to the mark.

Again there are a great many advantages which a large shop specializing on certain lines of work, nearly always has over a small one. A large business buys in great quantities and therefore cheaply; it pays low freight and saves on hauling in many ways. It often sells in large quantities and thus saves itself trouble and expense, and often gets a good price, as its reputation gives customers confidence. The large shop can spend large sums on advertising and for salesmen, draughtsmen, etc., for securing orders.

The large shops not only can afford highly specialized machinery and tools, but also highly specialized skilled workmen. They can contrive to keep each of their employees constantly engaged in the most difficult work of which he is capable, and yet so narrow the range of his work that he can attain the facility and excellence which come from long continued practice.

The head of a large business can reserve all his strength

for the broadest and most fundamental problems of his trade, providing he assures himself that his superintendent, foremen and clerks are the right men for their work, and are doing their work well; but beyond this he need not trouble himself much about details. He can keep his mind fresh and clear for thinking out the most difficult and vital problems of his business, and for contriving how to improve the efficiency of his workmen, to increase the production, and to secure new business.

But the small employer has not the time for much of this work, even if he has the ability. He must spend much of his time on work that is below him, and must do much routine work himself, as he cannot afford to neglect the minor but necessary details of his business, if he is to succeed at all.

THE ANNUAL CONVENTION OF THE RHODE ISLAND MASTER PLUMBERS' ASSOCIATION.

THE annual meeting of the Rhode Island Master Plumbers' Association was held at Pawtucket on Tuesday, December 8. In the afternoon the annual business meeting of the organization was held and officers elected, and in the evening the delegates were joined by their ladies and a banquet was held. The affair took place at the Plaza Hotel. The special guest of the occasion was James S. Cassedy, of Cambridge, Mass., vice-president of the National Association of Master Plumbers.

At the business session, which began at two o'clock, the methods of awarding contracts for plumbing and other work in the state institutions were discussed at length and protests against the placing of such contracts with firms outside the state were voiced by several speakers. A resolution was adopted requesting Governer-elect Beeckman to incorporate in his annual message to the general assembly a recommendation for the passage of legislation requiring the state board of control to give preference to Rhode Island plumbers when awarding contracts for plumbing and similar work at the penal and reformatory institutions of the state. Several other matters of local interest were also discussed by the convention.

After these matters had been disposed of President William J. Fogarty, of Providence, who was presiding over the deliberations, introduced Mr. Cassedy who spoke at some length on the benefits to be derived from membership in associations of master plumbers. Other speakers included Former Representative Thomas E. Manney, C. P. Brennan, John J. Shanley and M. F. Murphy all of Providence and Albert E. Entwistle of Pawtucket. These speakers are all prominent master plumbers.

The last business of the afternoon was the election of officers and it resulted as follows:

President, Joseph B. Hunt, of Pawtucket.
First vice-president, Edward Barry, of Providence.
Second vice-president, Lincoln Hammett, of Newport.
Third vice-president, Frank Merreweather, of Riverside.
Secretary, George A. Abbott, of Pawtucket.
Treasurer, Albert E. Entwistle, of Pawtucket.

Dinner was served at six o'clock and for an hour or more the delegates and their ladies gave strict attention to disposing of the tempting viands. When the last of the good things had been cleared away Christopher P. Brennan, of Providence, acting as toastmaster, presented the several guests of the evening.

The first to be called upon was Mayor Giles W. Easterbrooks, of Pawtucket, who welcomed the association to the city and expressed the hope that the gathering here would be found to have been of mutual advantage. Others who spoke included National Vice-President Cassedy, President-elect Joseph B. Hunt, Treasurer Albert E. Entwistle; the Retiring President, William J. Fogarty, Plumbing Inspector Reuben S. Bemis, of Providence; Ex-Alderman John C. Dunn, of Providence, and Clarence Seabury.

The members of the Pawtucket local association were in charge of the arrangements for the convention which was held in Pawtucket for the first time in the thirty-three years of the state association. The local committee was composed of Henry L. Graham, chairman; William Macomber, Hugh S. Holbourne, Albert E. Entwistle, Alexander D. Anderson and Hugh McIntyre. During the

Joseph B. Hunt, of Pawtucket, R. I.
Newly Elected President of the Rhode Island Master Plumbers' Association.

dinner hour a program of instrumental and vocal selections was rendered by local talent. Each guest received a pretty little favor, the gentlemen miniature electric lamps and the ladies an attractive little vanity case. The affair was a pleasant success and the members of the Pawtucket local were generously complimented. Over one hundred delegates attended the business session and counting the ladies there were fully twice as many gathered about the tables in the evening.

The new president, Joseph B. Hunt, has been in the plumbing business in Pawtucket for a number of years. He is prominent in the affairs of the city as well as in his craft and at the present time is a member of the city council. The new secretary and treasurer are also prominent locally.

Schofield Contracting Co. of Wheeling, W. Va., has received the heating contract for the parish house, owned by the DeChantel Academy.

The plumbing class, which is one of the features of the Evening Trades School at Springfield, Mass., is proving a great success and has a large registration.

Terpstra & Van Slóten, who have been engaged in the plumbing business in Saugatuck, Mich., have decided to give up their local office and make their main headquarters at Holland, Mich.

MORE COMMENTS ON HEATING ORDINANCE EDITORIAL.

Many comments, pro and con, have been received by "Domestic Engineering" since the publication in its columns of an editorial entitled "The Need of a Heating Ordinance," which appeared on November 14. A letter from Stewart A. Jellett, of Philadelphia, specialist in power, heating and ventilation, is interesting. It follows herewith:

"Editor 'Domestic Engineering':—I have read with interest the editorial in your issue of November 14, entitled 'The Need of a Heating Ordinance,' and while I believe that a heating ordinance, if properly drawn, would be of great benefit both to the owner and the legitimate heating contractor, I am sure that such an ordinance could legally go beyond the protection of the owner against dangerous or defective installation. All our large cities and many of the smaller ones protect the owner at the present time through the Building Inspection Departments which require that smoke flues shall be built in a certain manner; hot air flues, whether from furnace or indirect heating, shall be installed in a safe manner, and that the boilers or furnaces must be set in a certain way so as to insure protection against fire. This protection naturally comes under police protection on the ground of safety, but I note that your editorial indicates that such an ordinance should go much further, covering the size of the boiler, supervision of radiation, etc., etc.

"I question very much whether such an ordinance could be enforced. All large cities require that plumbers shall be licensed or registered, and that their plans must be submitted to the Board of Health and the work must be installed in a certain definite manner. This is entirely on the ground of protection to the health of the occupants of the building. The ordinance covering plumbing does not determine the character of the materials nor does it determine the size of the fixtures, with the exception of the size of the vent lines and soil lines for drainage. The inspection of electric wiring installation determines the size of the wire that shall be used to transmit a given current, but these sizes are fixed not to insure proper illumination, but to reduce the danger of fire. There are no requirements that I know of, affecting the inspection of electric lighting, which are based entirely or largely on the quantity or arrangement of the lighting or its effect on the eyes of the occupants of the building.

"It is true that the laws regulating the heating and ventilating of public schools do fix a minimum temperature and the air supply per occupant, but the state looks on public school children as wards of the state when in the school, and I do not believe that the courts would enforce an ordinance which required that an inspector should determine the amount of heating surface that a man should put in his house. The owner of a dwelling has a perfect right to live in a house with a temperature of 50 degrees if he wants it, and he also has a perfect right to have the temperature 80 degrees if he wants it, irrespective of any ordinance.

"The ground given in the editorial that such an ordinance would be a protection against the irresponsible heating contractors would not, I believe, stand a legal test, while, if such a scheme were legal and practical, it would be a great help to the legitimate heating contractor and would insure better work, but at the same time it impresses me as an interference with personal rights."

* * *

Another equally interesting letter comes from Henry B. Gombers, of New York, secretary of the National Association of Master Steam and Hot Water Fitters. Mr. Gombers writes as follows:

"Editor 'Domestic Engineering':—Regarding the editorial which appeared in the November 14 issue of 'Domestic Engineering,' I might say that a comprehensive reply is rather difficult to make, in view of the different opinions on the licensing of master steamfitters. I have heard from men in our organization who are equally earnest in their advocacy even though their views are diametrically opposed.

"Reference is being made to the plumber being licensed, but I have heard it stated that many reputable high-class plumbers are not so sure nowadays that benefits are derived from licensing of master plumbers. One reason assigned is that the ordinary every-day householder assumes that when a job of plumbing has been done by a contractor with a license, and the job inspected and passed by some one with a badge on him, it must be mechanically and otherwise correct.

"As a matter of fact, a job of plumbing could be 'thrown in' by a most incompetent journeyman following a plan and specification loosely drawn, yet not specifically violating a city ordinance, and might even pass inspection of a careless official when first installed, but, after being in service for a comparatively short while, would go all to pieces. The contractor might claim 'the job was inspected.' Yes, the job was inspected to see if city ordinances were complied with, but not inspected to see if material and workmanship were good and other warranties in evidence to which the customer was entitled.

"So, with this situation staring one in the face, it is difficult to form a definite opinion as to the advisability of advocating licensing of master steamfitters. You know that steam is not to be fooled with, and the licensing and inspections are not the only things to be taken into consideration in an effort to stop irresponsible people from going into the business.

"Anything of a proper character that will help the steamfitting fraternity to serve its purposes well, will be gladly welcomed, and, as we have repeatedly stated, we stand ready to assist Pro Bono Publico."

MANHATTAN MASTER PLUMBERS' ANNUAL BALL.

The Manhattan branch of the Greater New York Master Plumbers' Association held its annual ball and entertainment on Wednesday evening, December 9, with an exceptionally large attendance, and the affair was a perfect success in every respect.

A good vaudeville entertainment of a dozen star numbers opened the evening's program, and then J. J. Hannegan, president of the association, introduced Borough President Marcus M. Marks, who addressed the assemblage from the stage box he and Mrs. Marks occupied.

The grand march was a pleasing procession of beautifully gowned ladies and their gentlemen escorts and opened a long program of dancing for which Professor Usher furnished music.

Professor Mygrant's Military Band promenades alternated, giving a pleasing continuity of music throughout the evening.

Many of the association's prominent out-of-town friends were on hand for the celebration. Among them were National President S. Louis Barnes, National Secretary D. F. Durkin, Jr., Edw. F. Roberts, president of the Philadelphia local; former National Director G. F. Uber, Harry B. Lentz and National Treasurer William McCoach, of Philadelphia; National Director John Trainor

of Baltimore, former National President Walter D. Nolan of Washington, John F. Rogers of Flushing, treasurer of the Greater New York body; former National President A. Selden Walker of East Orange, N. J.; Sam F. Wilson of Newark, N. J., who was secretary under Mr. Walker's administration. Among the prominent local members were Former National President Frank J. Fee and I. J. Brown. From the Bronx came the popular coroner, William J. Flinn. From Brooklyn, President D. J. Donovan and Vice-President M. J. Kennedy, and from Paterson, N. J., Robert Quinn and President Frank A. McBride and ladies.

The supply and manufacturing fraternity was also exceedingly well represented.

Unreserved praise is due the committee, captained by Isaac J. Brown, which so efficiently arranged for the pleasure of the association's guests, on this, the greatest evening in the history of the Manhattan plumbers. Mr. Brown was assisted by Harry Hemlin, secretary-treasurer; Frank B. Lasette, B. F. Donohoe, Thos. P. McLoughlin and John R. Hopkins.

DAYTON MASTER PLUMBERS' ANNUAL BANQUET.

One of the most successful social affairs ever given by the Master Plumbers' Association, of Dayton, O., took place Monday evening, December 7, when an elaborate banquet was served in the Mascotte Hall, 33 South Main Street, in that city.

Preliminary arrangements were made for the function by a special committee, consisting of Harry P. McGrath, chairman; Frank C. Clemens and Rolla Williams, and the efficiency with which they performed their duties was well reflected in the splendid manner in which their efforts materialized.

The tables were spread the entire length of the big hall, and the chairs were arranged so that all the guests sat facing each other. The tables were beautifully decorated by William B. Brehm and William H. Anderson, proprietors of the hall, and the entire surroundings were in complete harmony with the pleasant occasion. About 45 members of the organization participated in the event.

Chairman McGrath presided as toastmaster, and a number of impromptu talks contributed to the enjoyment of the evening, the addresses bearing especially upon topics of special interest to the organization. B. L. Lehman is the president of the organization, and Edward Stutzenbach, secretary.

Sympathy of the association and regret for the absence of Frank Curtner, one of the members who has been confined to his home by an attack of pneumonia for some time, was expressed in the form of a magnificent bouquet of flowers, which was sent to his home.

PUBLIC COMFORT STATIONS CONTEMPLATED.

Efforts are being made to have public comfort stations erected in different parts of Wheeling, W. Va.

The Trades Assembly of Utica, N. Y., is advocating the establishment of public comfort stations in different parts of that city.

A petition is being circulated in Waterbury, Conn., and will soon be presented to the board of aldermen asking that an appropriation for the construction of a municipal comfort station be made this winter. Many voters have already signed the petition.

GOVERNMENT CONTRACTS TO BE AWARDED.

Supervising Architect O. Wenderoth, Treasury Department, Washington, D. C., will receive sealed proposals for government work as follows:

Until 3 p. m., January 14, 1915, for the construction complete, including plumbing, heating and lighting, of medical quarters at the United States Marine Hospital, Wilmington, N. C. The building is a two-story frame structure with a ground area of 1,170 square feet.

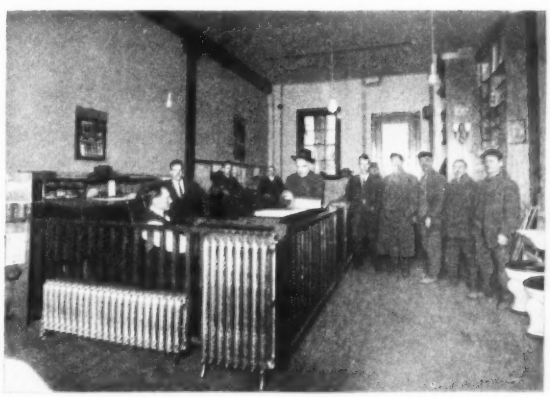
Until 3 p. m., January 26, 1915, for the construction complete, including plumbing, heating and lighting, of the United States postoffice and courthouse at McCook, Neb. This is a three-story and basement building with a ground area of 6,000 square feet.

Until 3 p. m., February 8, 1915, for the construction complete, including plumbing, heating and lighting, of the United States postoffice at Tiffin, O. This is a two-story and basement building with a ground area of 5,800 square feet.

Plans and specifications for the above buildings may be obtained from the custodians of the different states or at the office of the Supervising Architect in Washington, D. C.

THE "RIGHT-HAND" MAN ON THE JOB.

Herman C. Miller, the superintendent or in other words —the "right-hand" man of Hineline & Co., the well-known plumbing and heating contractors of Minneapolis,



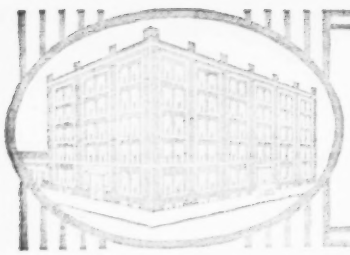
Herman C. Miller at His Desk.

Minn., is shown in the accompanying cut. In the handling of journeymen, Mr. Miller has a reputation for efficiency which has won the commendation of his employers. He is seen in the picture, seated in solid comfort in his official chair in the offices of the company.

Bernard J. and Thomas F. Haggerty, who have conducted a plumbing business and hardware store on Sumner Street, Adams, Mass., for a number of years past, have dissolved partnership. Bernard J. Haggerty will continue the business.

W. P. Birdy, 179 N. Main Street, Bristol, Conn., has been awarded the contract for the plumbing in a store and tenement building on North Main Street, for Sherman E. Brown.

John F. Bresnahan, inspector of plumbing and inspector of milk, at Fitchburg, Mass., has been elected secretary-treasurer of the Massachusetts Milk Inspectors' Association.



Among the Wholesalers and Manufacturers

COMPANIES RECENTLY INCORPORATED.

The Nez Perce Automatic Wrench Co., of Nez Perce, Idaho, has just been incorporated under the laws of that state.

The Portland Vacuum Cleaning Co., of Portland, Ore., has been incorporated by N. B. Wright, G. G. Idvine and J. M. Joice.

The Thermo Appliance Co., of Sacramento, Cal., has been incorporated with a capital stock of $200,000 by A. J. Brown, D. W. Carmichael and S. J. Kenworthy.

The American Asbestos & Manufacturing Co., of San Francisco, Cal., has been incorporated with a capital stock of $1,000,000 by W. B. Stone, E. E. Stone, J. A. Voorhees, C. W. Walter and R. R. Norton.

THE DECEMBER MEETING OF THE MASSACHUSETTS CHAPTER A. S. H. & V. E.

Edwin C. Baldwin, a member of the state board of education, discussed schoolhouse ventilation at the December meeting of the Massachusetts Chapter of the American Society of Heating and Ventilating Engineers, held at the Revere House, Boston, on Tuesday evening, December 8. Mr. Baldwin admitted that the ventilation of many Boston schoolhouses was poor and said: "If you can find a system of ventilation which is new, speak about it and the Boston school department will try it. No system has been invented which is not in use in some one of Boston's schools." Public School Ventilation was the general subject of the evening. Other speakers included Ex-Mayor Stone of Quincy, who is vice-president of the chapter; Major J. W. H. Myrick, Commissioner of Public Work; Louis K. Rourke and S. H. Wheeler of Fairfield, Conn.

DECEMBER MEETING OF THE ILLINOIS CHAPTER A. S. H. & V. E.

The regular monthly "get-to-gether" of the Illinois Chapter of the American Society of Heating and Ventilating Engineers was held Monday evening, December 14, at the Great Northern Hotel, Chicago.

The meeting was one of the most interesting and instructive that has been held for some time. After the usual dinner in which twenty-five of the members participated, talks and discussions were in order.

Dr. Vernon Hill, of the ventilating division of the Bureau of Sanitation, Chicago, gave his opinion on the subject of Air Conditioning for residences. Other speakers who discussed this topic were: A. Bement, Frank Douglas, D. I. Cook and Professor J. W. Shepard. Mr. Bement showed a device for humidifying residences which evoked much interest among the members. The next meeting of the chapter will take place on the second Monday evening in January at the Great Northern Hotel. Two subjects will be discussed, namely, "Restaurant Ventilation," and "Methods of Correcting Defective Jobs."

ANNUAL CONVENTION OF JOHNSON SERVICE CO'S. MANAGERS AND SALESMEN.

The annual convention of managers and salesmen of the Johnson Service Co., took place at the concern's headquarters in Milwaukee, Wis., December 2 to 4, inclusive. Various subjects in connection with the business of temperature regulation and humidity control were presented by several of the members, and discussion of policies, new apparatus, etc., formed the program arranged by the executive officers: H. W. Ellis, president; Paul F. Johnson, secretary-treasurer; and Carl F. Johnson, vice-president. Twenty-four out of the firm's thirty-two managers were in attendance. They were: B. T. Voute and F. E. W. Beebe of New York; Kennedy Duff, and Stanley B. Plewes, Philadelphia; C. C. Choffin, Pittsburg, Pa.; W. A. Fenn, Buffalo, N. Y.; F. E. Parker, St. Louis, Mo.; O. G. Ward, Cleveland; William N. Harding and C. B. Clarke, Indianapolis, Ind.; F. A. DeBoos, Kansas City, Mo.; H. J. Gilson, J. A. Cutler and C. G. Burritt, Chicago; A. G. Caldwell, San Francisco; Geo. M. Russell, Minneapolis; J. A. Stuart, Denver; J. S. Rice, Cincinnati; H. A. Hamlin, Detroit; C. L. Fortier and William H. Wilson, Milwaukee.

UNITED STATES LEAD IN SOUTH AMERICAN TRADE.

Trade of the United States in 1913 with the twenty Latin-American republics, both in sales and purchases, exceeded in volume that of any other single country, according to John Barrett, director-general of the Pan-American union, in an address delivered before the Latin-American commercial conference this week. It was the first year, he said, the United States had exported to Latin-American countries products of a greater valuation than had the United Kingdom. Mr. Barrett's conclusions were based on statistics just compiled by the Pan-American union. The figures showed that the twenty independent countries south of the United States conducted a foreign commerce in the calendar year 1913 valued at $2,864,876,224, of which their exports were $1,539,123,597 and imports $1,325,752,627. United States exports to Latin America were valued at $325,837,343; those of the United Kingdom at $322,228,073; of Germany, $217,976,202; and of France, $110,484,385. Imports from Latin America were: United States, $477,628,500; United Kingdom, $321,358,313; Germany, $189,156,172; France, $128,329,068.

COMMENTS ON ARTICLE ON "HOW TO SECURE TRADE IN SOUTH AMERICA."

After reading N. J. Wisner's article on "How to Secure Trade in Plumbing and Heating Goods in South America," which appeared in "Domestic Engineering," November 28, B. T. Beardsley, of Detroit, Mich., who has for

a number of years been identified with the plumbing supply trade, writes us as follows:

"N. J. Wisner is right concerning trade conditions in South America in general and in Buenos Aires in particular. In order to be able to sell goods you must be able to speak Spanish and you must also know the game. Argentina is one of the finest countries. It uses an immense amount of goods and always wants the best. Some of the residences there are as fine as any the United States can show. The people are extravagant and love luxury. I spent a number of years in Buenos Aires and Montevideo and found the people very liberal when it came to luxury. I have in mind an instance of this kind. A man, who owned a farm sixteen miles from Buenos Aires, had everything in the way of horses and gardens. In one of his gardens he had 1,080 different varieties of roses. All the bedrooms had bathrooms attached, and he also had a large swimming pool in his patio."

SAMUEL JACOBSEN TAKEN BY DEATH.

Samuel Jacobsen, former vice-president and manager of the Burlington Brass Works, Burlington, Wis., died at his home in that city on Thursday, December 10, after a lingering illness lasting a year and a half. Mr. Jacobsen was born in Copenhagen, Denmark in 1866, and came to Chicago in 1884. Being of an inventive turn of mind he succeeded in making what was later called the "Never-

The Late Samuel Jacobsen, of Burlington, Wis.

Split" closet seat. This seat was for a time manufactured by the Jacobsen & Hanson cabinet factory on Bloomingdale road in Chicago. Having outgrown the facilities of this plant he organized the Never-Split Seat Co. and moved to Evansville, Ind., about seven years ago. In 1910 he sold his interest in this concern and moved to Burlington, Wis., where he became one of the organizers of the Burlington Brass Works, and served as its vice-president and manager until the spring of 1913, when the fatal illness overtook him. His genial and companionable disposition make him many friends in the plumbing supply trade, who will receive the news of his death with sincere regret. He is survived by his wife and two children, a son and a daughter.

REPORT TOUCHING ON VENTILATION LAWS, THE PURCHASE OF COAL BY HEAT UNITS, AND THE WASTE OF MINERAL RESOURCES.

The saving of human life in the mines, the stopping of millions of dollars of waste of mineral resources of the country, and an inventory of the wastes that are continuing are given important consideration in the fourth annual report of Dr. Joseph A. Holmes, Director of the United States Bureau of Mines, made public this week. In the course of his report, Dr. Holmes states: "Each day poor ventilation and resulting bad air injure the health of thousands of miners. In most of the metal-mining states the statutory provisions are incomplete and inadequate, and there is the greatest disparity between them as to what constitutes sufficient ventilation to keep mine air pure. In fact, no adequate system of ventilation is generally in force today in the metal mines of the country." The bureau, in addition to attempting to prevent the explosion of coal dust in mines, which has resulted in great loss of life, has been investigating methods that would stop such explosions after they had started. During the year, four such devices were perfected by George S. Rice, the chief mining engineer of the bureau, and patented for the benefit of the mining industry. The bureau also claims that through its scientific method of purchasing coal by measuring the heat units the Federal Government has saved during the year $200,000, and that the various cities of the country that have taken up this plan of buying coal have reported a saving last year of thousands of dollars. Director Holmes places the present waste of mineral resources of the country at the sum of one million dollars a day and declares that in a large measure this waste is unnecessary. "In one respect at least," says the director, "the consideration of mineral waste has a basis quite different from the consideration of agricultural wastes. Our crops represent an annual production from a reasonably permanent soil; our forests may grow again, though a much longer period of time is required; and the soils themselves may be reproduced from the subsoil and the rock beneath. But of our mineral resources we have only the one supply. This supply is to a considerable extent destroyed by use, and at the present increasing rate at which we are using and wasting it our one supply of a number of these resources will be either exhausted or largely depleted while the nation is yet in its youth." Referring to coal, Dr. Holmes says: "A careful estimate indicates that in the mining of 600,000,000 tons of coal during the last calendar year there was wasted or was left underground in unminable condition 300,000,000 tons of coal. As a result of careful preliminary inquiry, it is believed that more than one-half (200,000,000 tons of coal) of this yearly waste is preventable under existing economic conditions. But the bare statement of the enormous losses does not, perhaps, express the most important part of the situation, which is that the coal we are now using and wasting represents the cream of our supplies, namely, the coal that is the best, is most easily and cheaply mined, and is nearest the great centers of industry." Referring to still other wastes, Dr. Holmes says: "A preliminary inquiry as to the coking of coal in beehive ovens has shown that the total value of the by-products annually lost in this country through the use of such ovens amounts to $75,000,000. Although the desirability of developing by-product industries in this country has been recognized, such development has now become an

actual need. The bureau has also ascertained that the annual waste of metals in brass-furnace practice amounts to more than $4,500,000."

Personal Mention

Paul C. Wooster has recently been made manager of the Chicago office of the Ruud Mfg. Co., of Pittsburgh, Pa., which position until recently has been occupied by W. L. Powers.

Max Siegel, live wire representative for Baer Bros., of New York, was describing himself to a Pittsburgh friend the other night as a bronze peddler, but the fact of the matter is, Max is and has been a real bronze powder salesman for 20 years.

M. H. Feldman, one of the coast to coast envoys of the John Wood Manufacturing Co., Conshohocken, Pa., has been doing some hustling through the central states during the past few weeks. On Monday and Tuesday of this week he was registered at the Fort Pitt Hotel in Pittsburgh, Pa.

W. P. Stauder, manager of the eastern division of the Leader Iron Works, of Owego, N. Y., and E. W. Ross, also with the above company, passed through Chicago last week on their way to their homes for two weeks' holiday. Mr. Stauder's home is in Decatur, and Mr. Ross hails from Peoria.

E. Abraham Krah, manager of the Pittsburgh office of the Pittsburgh Water Heater Co., was encountered by one of "Domestic Engineering's" representatives while traveling through Ohio this week. Friend Krah is among the old timers in the water heater business and has given the heating question so much careful study that he now is classed among the authorities on the subject.

Fred B. Edell, who has been connected with the Sloan Valve Co., of Chicago, for a number of years, has just been promoted to the position of sales manager for this company. Mr. Edell has in turn covered Eastern, Southern, Canadian and Western territories for the Sloan Valve Co. in a most successful manner. His promotion is therefore well-deserved, and his many friends in the trade are congratulating him on his advancement.

The grocery salesman has a good story which almost convinces us that English walnuts really should go up in price on account of England's participation in the war. Now George Gray Dyer, of the Trenton Potteries Co., springs one on us which really does convince us that he is still selling train loads of vitreous china ware as China is not at war. K. G. Agler, the man who hobnobs with the architects in the interests of the Scioto Valley Supply Co., Columbus, O., listened to George's story last week, and came back with one which explained to George just why French Vichy could be bought in St. Louis cheaper than before the war started.

THE INTERNATIONAL PLUMBERS' SPECIALTY CO. MAKES ASSIGNMENT.

The International Plumbers' Specialty Co., of 143 Chambers Street, New York City, has made an assignment, scheduling its liabilities at $2,969, nominal assets at $787, and actual assets at $503.

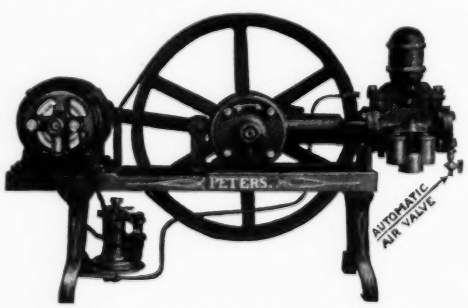
ARMSTRONG RATCHET CEILING NIPPLE THREADER.

The Armstrong Mfg. Co., of Bridgeport, Conn., is marketing a tool which it is said is "catching the eye of the trade." It is known as the Armstrong Ratchet ceiling nipple threader, and is made to thread pipe projecting a short distance from the ceiling or wall. It is fitted with two dies, one on each end of holder for each size of pipe, and bushings to match to insure straight threads. The company explains that one die is slightly oversize to be used to start the thread, and the other is to finish the thread to standard size. The device is provided with a ratchet so that an operator can cut a close thread without marring or defacing the ceiling or wall. To back off the die it is only necessary to reverse the ratched pawl. It is also pointed out that the holder will take the following dies, ¼, ⅜, ½ inch, right or left. Parties desiring more information regarding this threader can obtain it by writing the company, mentioning "Domestic Engineering."

The "Armstrong" Nipple Threader.

ELECTRIC HOUSE FORCE PUMPS.

The accompanying illustration shows one of the double-acting, belt-driven noiseless electric house force pumps, which are manufactured by the Peters Pump Co., of Kewanee, Ill., which was established in 1890. This pump is adapted to pneumatic water supply systems, where electric current is available, and it is also suitable for cisterns or shallow wells not exceeding 20 feet of vertical suction. It is claimed that for compactness, reliability and efficiency, a more suitable pumping unit could not be designed. The pump is fitted with ¼ h. p. motor, for alternating or direct current, and also with two-pole automatic air valve, and it is self-oiling by means of a splash system. The company explains that the automatic switch is



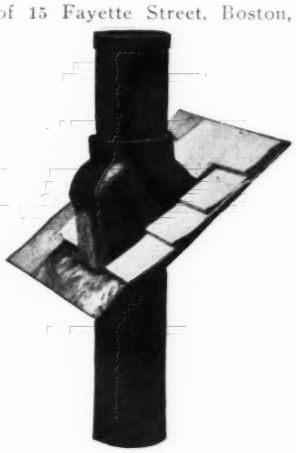
The "Peters" Electric House Force Pump.

equipped with a ¼ inch copper tube, 3½ feet long, with fitting at the end for ¼ inch pipe thread; this it is said should be connected to the service line between check valve and tank, or may be connected to the discharge line from the tank, whichever is most convenient. This tube it is further explained, supplies pressure for the automatic switch. The pump is brass lined and equipped with every necessary detail. It has a capacity of 195 gallons per hour, having 100 double strokes per minute. The pressure is up to 80 pounds or 160 feet elevation. Its dimensions are 36 inches in length, width 11 inches, and height

23 inches. Interested parties can obtain full particulars from the manufacturers upon request mentioning "Domestic Engineering."

THE "WIZARD" ROOF FLANGE.

The Wizard Mfg. Co., of 15 Fayette Street, Boston, Mass., has for some time been demonstrating to the trade in all parts of the country something new in the way of a roof flange. The concern contends that this flange will fit any style and angle of roof, and that is is not necessary to take the fire pot on the roof when installing—as the flange can be calked on the ground, or on the roof if desired. This specialty is marketed under the trade mark "Wizard." The accompanying cut shows the flange in position. The company claims further, that it takes a small amount of lead to make a joint where these flanges are used, and also little time to put them into place, as they require no cutting nor bending. Men in the trade desiring further particulars are invited to write the company at the address given, mentioning "Domestic Engineering."



The Metal Market

Iron Market Holding Its Own.

Advices from the industrial centers indicate a change for the better in that the managers of the railroads are beginning to order new cars. Recently the Pennsylvania R. R. reported orders for 1,050 steel coal cars requiring about 12,000 tons of steel. The Union Tank Line is purchasing 1,000 tons of steel. The Northern Pacific has closed an order for 125 passenger coaches and the Great Northern has also ordered 21 coaches. The Philadelphia & Reading R. R. has ordered 200 steel car underframes from the American Car & Foundry Co. and the Nashville, Chattanooga & St. Louis R. R. is reported to be in the market for 12 locomotives.

The pig iron buying movement is still in progress, although it is not as active as last week. Producers appear to be accumulating stock as the steel interests are operating the blast furnaces at greater rate of speed than the steel mills have consumed iron. It is generally thought in the trade that the trend is favorable. At any rate, there are no unfavorable signs and the net result is slow progress towards recovery. Prices for pig iron are as follows:

No. 1 Northern Foundry, New York	$14.25	to $14.50
No. 2 Northern Foundry, New York	14.00	14.25
No. 2 Southern Foundry, Birmingham	9.75	10.00
No. 2 Southern Foundry, Cincinnati	12.75	13.25
No. 2 Northern Foundry, Chicago	13.00	13.50

Copper.

The copper market continued steady and strong, prices for electrolytic going as high as 13½ cents which is the highest point reached on the present movement. The output at the mines has been cut about 50 per cent. The foreign demand continues to be strong particularly from England and France, thus causing a rise of about 2 cents per lb. since the outbreak of the war. The St. Paul R. R. is reported to have given orders for copper required for the electrification of the Mountain division. Quotations are 13 to 13.25 cents f. o. b. New York.

Tin.

Prices for tin ruled strong and higher both in the domestic market and London. There was a good demand from consumers for nearby and the first quarter in 1915 deliveries. The foreign market suffered a setback due to liquidation of speculators but quickly recovered. Prices for spot are 33.25 cents to 33.75 cents.

Lead.

Lead continued quiet but firm in New York at 3.80 cents and East St. Louis at 3.70 cents.

Spelter.

The market showed activity and closed with prices higher in New York.

Old Metal Market.

New York dealers' buying prices are all nominal as follows:

Strictly crucible copper	$11.25	to $11.50
Light copper	9.25	9.50
Uncrucibled copper wire	10.75	11.00
Uncrucibled heavy copper	10.75	11.00
No. 1 machine composition	10.00	10.25
Heavy brass	8.00	8.25
No. 1 composition turnings	8.50	9.00
No. 1 brass turnings	7.25	7.50
New brass clippings	8.25	8.50
Cocks and faucets	8.75	9.00
Light brass	6.37½	6.50
Solder joints	7.00	7.25
New aluminum	13.00	13.50
Heavy lead	3.40	3.50
Tea lead	3.00	3.12½
Scrap zinc	3.60	3.65
Tin pipe	27.50	28.50
No. 1 pewter	20.50	21.50

A NEW STEEL PROCESS.

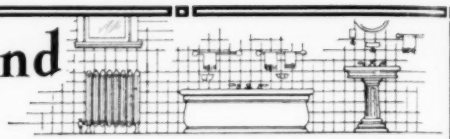
The discovery of a new method of treating steel by which the finished metal will have several times the strength of the present product has been announced before the National Academy of Sciences by Prof. A. A. Michelson, of Chicago, who two years ago won the Nobel prize for physical research work. Prof. Michelson spoke of "the action of metals at the rupture point" and explained the new steel which he said would revolutionize warfare by making fortifications as well as ammunition many times stronger than at present. The new steel would advance peaceful projects, he said, by permitting the erection of skyscrapers to heights never yet undertaken and the construction of greater suspension bridges than have ever been built.

Clearing the Way.

"When frightened by an automobile my wife has a dangerous habit of trying to dart ahead of the machine."

"My wife seems to think she has the best system. She goes straight up in the air."—Kansas City Journal.

Among the Plumbing and Heating Contractors



Illinois

Chicago and Vicinity.

Crl J. Stein, 853 South State Street, has recently been awarded the plumbing contract for an eighty-flat building to be erected at 60th Street and Blackstone Avenue. The heating contract went to the Stratton Co., 7354 St. Lawrence Avenue.

The H. G. Wolff Co., 3337 North Halsted Street, will install the plumbing fixtures in a four-story office and factory building to be erected at 212-16 West Austin Avenue.

J. J. Dunbar & Co., of 415 Milwaukee Avenue, will install the heating system in five flat buildings (total cost $35,000), to be erected at 2534-39 Aubert Avenue.

Nordberg & Slater, of 5215 Broadway, have secured the plumbing contract for a three-story and basement building to be erected at 1226-8 Norwood Avenue, at a cost of $22,000.

The steam heating system in a three-story flat building to be constructed at 1350 Rosedale Avenue, will be installed by William Klender of 3408 Sheffield Avenue.

C. J. Braker has opened a plumbing shop at 311 E. 61st Street. Mr. Braker was formerly inspector in the water pipe extension service.

George A. Leebody, of 3613 North Ashland Avenue, has been awarded the plumbing contract for a three-story and basement building to cost $75,000, which will be erected on Lakeside Terrace, Evanston.

The heating system for a $60,000 factory and warehouse to be built at 461-73 West Erie Street, will be installed by E. J. McDonough, of 2341 Keystone Avenue.

M. Weil, 3744 Chicago Avenue, will install the plumbing in a modern flat building to be erected at 4531 North Campbell Avenue.

Other Cities in the State.

R. G. Saxer of Wilmette, Ill., has secured the contract for installing the plumbing in a two-story and basement residence in that town.

George Long of Waukegan, Ill., has been awarded the hot water heating and plumbing contract for a two-story residence costing $4,000, to be built in that city.

Ohio

Cincinnati and Vicinity.

Prospects are excellent for the elimination by the next Ohio legislature, which meets in January, of the numerous conflicts which have grown out of the contradictory provisions now standing in the state and the various municipal building codes, and which have been especially pronounced in the plumbing department. The State Citizens' Building Committee, consisting of architects, contractors and others interested in straightening out the tangle, has reached an agreement with the State Building Code Commissioners, who have charge of the code, under which the latter will incorporate in the proposed amendments to be submitted to the legislature many provisions desired by the Citizens' Committee. The Commissioners have been preparing a complete code, to fill out what has already been adopted and placed in force; and when the new provisions referred to have been adopted, it is hoped that the irreconcilable conflicts which have been developed will be eliminated. Such matters as clashes of authority between local and state health authorities, and the condemnation by state inspectors of work, which has been approved by local inspectors under city codes, will then be impossible, and architects and contractors will be able to go ahead with some degree of certainty.

Joseph S. Glassmeyer, a Cincinnati builder, is preparing to start work on a modern apartment house in Avondale, which is to cost in the neighborhood of $125,000, with a view to having it ready for occupancy early in the summer of 1915. The structure will be of brick and will contain eighteen separate apartments, making the plumbing and heating involved considerable. These contracts have not yet been let.

City Manager Charles E. Ashburner of Springfield, O., has issued to the sewer inspectors in that city a warning to the effect that unless they see that sewer services are laid to the curb there will be trouble. It seems that in many cases contractors have failed to do their part by laying sewer service lines to the curb when building mains, and thus the plumbers connecting residences to the lines have had to do additional work and make additional charges, which has caused much complaint from citizens. With the inspectors on the job, in fear of discharge, as threatened by the city manager, this will probably not occur in the future.

Massachusetts

The plumbing, heating and lighting business of O. S. Kendall & Son, the oldest concern of the kind in Worcester, has changed hands. Oliver S. Kendall, who established the business in 1872, died in April this year, and since that time his son, O. S. Kendall, Jr., has been in active charge. The new concern is represented by William E. and Ernest C. Mulvey, and it is reported that they paid about $50,000 for the business. The change in ownership will take place on January 1. The new owners proposed to continue the present lines but to specialize in electrical work. Nearly fifty per cent of the plumbers in Worcester today are graduates of the Kendall shop, and in the past forty-two years the firm has placed either plumbing, heating or ventilating in practically every public school building erected in Worcester, plumbing and heating in many of the churches of Worcester and vicinity and similar work in numerous fine residences in the county. The plumbing in the Mark Hopkins million dollar residence at Stockbridge was installed by the concern. According to Mr. Kendall, the company has done an annual business of $100,000 in recent years.

Michigan

Detroit and Vicinity.

The Board of Education of Detroit has established a new rule for the letting of contracts for the erection of school buildings. Hereafter contractors who make general bids must give the names of the sub-contractors who will do the work on the contract. The reason for this is said to be that some of the contractors bid on plumbing, heating and ventilating and then peddle the jobs to whoever will go under those figures. Under the new system, the general contractor must name who the plumber will be, in case he lands the contract, and if he is successful in being awarded the work, the plumber specified must do that particular part of the job as specified.

A. W. Schultz, 815 Gratiot Avenue, has been awarded the heating and plumbing work for the Joyce, the Ellis and the Cadillac schools to be erected at once.

Robert Addy, 1960 Fort Street, S. W., has just secured two good-sized contracts, which will tide his force over for some time; both are for large new residences being erected in North Woodward. He also secured a third contract which calls for the plumbing to be installed in a new factory building on the west side.

Wisconsin

The office and shop of the W. W. Rasmussen Co., Racine, Wis., has the reputation of being one of the most up-to-the-minute plumbing establishments in that section of the Badger State. The interior of the concern's building is all of white enamel, and contains separate partitions for each particular display. Each compartment is well

Corner in the Showroom of W. W. Rasmussen Co., at Racine, Wis.

lighted by means of an individual electric light placed above the compartment. The bathroom apartments are differently arranged, showing the different ways that a modern bathroom can be installed. When the place is illuminated at night, thirty-three different lights burn from 7 to 11 o'clock. These lights very effectively attract public attention. An electric clock regulates the whole lighting system during the hours mentioned. The shop is protected from fire by an ample supply of fire extinguishers. The accompanying picture shows one corner of this progressive plumbing establishment.

Pennsylvania

Plans for the heating and plumbing work for the new state prison at Rockview Station, Center county, Pa., are being made by Architect J. T. Windrim, Commonwealth Building, Philadelphia, and bids may be asked for in about a month.

Mulch Bros. of Holidaysburg, Pa., have received the heating contract for the abbatoir, being built at Altoona, Pa., by the United Home Dressed Meat Co. of Gallitzin, Pa.

H. T. McAdams, Pittsburgh, has received the plumbing contract for the residences being erected here by Frank H. and David Kriemeier.

James M. Reidy of Oil City, Pa., has been awarded the plumbing contract for the office building being built there by the United Natural Gas Co.

Kentucky

Louisville and Vicinity.

One of the most important pieces of news for the Kentucky plumbers and steam fitters is that the State Court of Appeals has held the workmen's compensation law, enacted at the 1914 session of the legislature, and of which so much was expected, unconstitutional. The law was to have gone into effect as to its compensatory provisions on the first of the year. Now both employers and employees who were in favor of it are at a loss as to how to proceed for, though the majority opinion of the court, which was divided, suggested the probability that the legislature could pass a law which would be constitutional, the finding of the minority reached the conclusion that under the present state constitution and the decision of the majority, passage of an effective compensation law would be impossible.

In a test case filed some time ago, the law was upheld in the lower court, and there was more or less confidence that the Court of Appeals, the final court in this state, would also give the measure its approval. Plumbers and steam fitters with a payroll on which more than six names appeared, would have been subject to the law's provisions, and in a good many cases had made provisional preparations, either with the state or commercial companies, to carry the required insurance. The Louisville Master Plumbers' Association spent the better portion of several meeting nights in discussions of the best methods of procedure under the new law. The finding of the court turned on the contention that the law had the effect of depriving employees and employers of certain rights guaranteed them by the constitution to recover for injuries, etc. The court granted that employees have the right or privilege to waive this constitutionally given right, but that in its operation the compensation law would have automatically forced them to waive these rights or be denied cause of recovery, a thing which the court held was contrary to the constitution. The minority opinion referred to this phase of the case as a conjecture and stated that the three judges who signed it were of the opinion that the majority was not making sufficient distinction between elective and compulsory requirements.

P. H. Meyer & Co., 640 S. Preston Street, was recently awarded a contract for the heating and ventilating plant

Tested with the Rest and Found to be the Best

A great victory for the "HOFFMAN"

Chosen as the Official Heater for the Panama Pacific International Exposition.

The New Improved

HOFFMAN

Automatic

Gas Water Heater

combines all good features of other heaters, and has none of their faults.

Costs less—does more.

Always satisfactory.

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"IT'S ALL IN THE SEAL"

The Original Trane Mercury Seal System of Vacuum Heating

Patented

accomplishes more with less cost of maintenance than any other system devised. The secret of its efficiency lies in the

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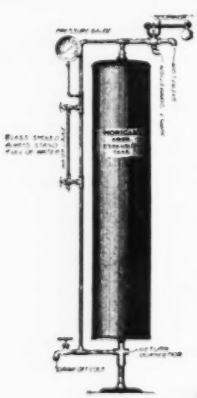
Find out all about it.

Write today for details.

Vacuum Heating Co.

1315 Cherry St. Philadelphia, Pa.



HORIGAN'S

Aqua Expansion Tank

PUTS NEW JOB IN RIGHT, because it lets you inside the money, which is the thing you are after.

CURES THE SICK JOBS, which will give any heating doctor a reputation.

BRINGS BACK TO LIFE the dead ones in a most miraculous manner.

PUTS YOU ON THE FIRING LINE with a full steel armor on from the crown of your head to soles of feet.

YOU WANT IT, because you need it in your business.

"EVERYTHING BELOW STAIRS."

Let us tell you all about it. Write today

Price $11.50 Net

HORIGAN SUPPLY CO.

St. Joseph, Mo.

for the new Emmet Field School to be erected in Crescent Hill. Bids on this work were received by the Louisville board of education until December 1.

M. J. Duffy & Sons Co. has secured the contract for plumbing the new Stockyards Exchange Hotel.

J. M. Bywater, of the plumbing firm of Bywater Bros., 512 S. 6th Street, is also supervisor of the sewer department of the city of Oakdale, which adjoins Louisville on the south. Oakdale has just completed a new system of sewers and Mr. Bywater has notified the property owners that the sewer department of the municipality is now ready to install the house connections from main sewers to property lines.

Harrodsburg is contemplating a new system of water works, as the present system is inadequate for the town's requirements. S. M. Williams, a hydraulic engineer of Louisville, was recently present at a meeting of the council and advocated drilling one or more wells near the pumping station from which he believed enough water could be had under a meter system to supply the city. At present 350,000 gallons of water are pumped daily, but it is said, that half of this amount is wasted.

The Louisville Water Co., which a short time ago was considering adoption of the meter system throughout the city, and even in private residences, has given up the idea. During the spring all new contracts written bore a clause whereby the company would refund on the contract when the meter system was put in. A change in management is explanation of the company's change in policy.

Articles of incorporation of the Sanitary Plumbing & Heating Co. of Winchester, were recently filed. The incorporators are W. E. Curry, T. J. Boone and H. H. Moore. The new company will take over the business of T. J. Boone, which for a number of years has been conducted on West Broadway. Mr. Boone will be general manager of the concern, which will continue at his old stand on Broadway. The capital stock of the new corporation is $2,000, with a debt limit of $5,000. The company will carry a stock of plumbing and gas fixtures.

J. K. Skaggs has purchased Charles Reid's plumbing business at Horse Cave, along with the latter's grain mill and electric light plant. He expects to carry a large stock of plumbing supplies and increase the business considerably.

A. R. Schultz, of Springfield, has formed a partnership with Barber & Pettis, and the new concern will be known as A. R. Schultz & Co. The firm will handle general plumbing and tinning from the old Barber & Pettis shop. Mr. Schultz was formerly in the plumbing business.

Lexington recently passed a sanitary ordinance at a city council meeting in which it was ordered that every building situated on a street where there is a sewer must be connected with the same. Each lot on which there is a building used, or intended to be used as a human habitation, or where persons are employed, shall have a separate connection with the city sewer if a sewer is available. On unsewered streets sanitary privy vaults must be constructed according to specifications provided in the sanitary code, and each property owner must pay a privy vault tax of $3 per year.

The city council, of Madison, Ind., has decided to change the water works system entirely and with that idea in view has awarded a contract to Charles Kraus & Sons, of Indianapolis, Ind., for drilling four wells, which will be seventy-two feet deep. These four wells, it is thought, will be capable of supplying the city with water. Machinery contracts have not yet been let.

California

San Francisco and Vicinity.

Plumbers report a considerable amount of small work, chiefly repair, and very little in the way of large contracts. The rainy weather, the approach of the holidays and the anticipation of the coming rush of visitors for the opening of the Panama-Pacific Exposition are all given as causes of the rush of repair and betterment work at this time. There has been a general improvement in the matter of collections during the last two or three weeks; and the trade is taking a good deal of encouragement from this, and are predicting a decided improvement in conditions during the early part of next year.

The Turner Co. has secured the contract for the gas-fitting, plumbing and steam heating for the W. A. Lehrke Building at Irving Street and Sixth Avenue for $2,200.

Contracts for the San Francisco Civic Center Power and Heating Plant were awarded this week. The contract for furnishing and installing the underground distributing system went to Wittman, Lyman & Co., for $23,964. The boilers will be supplied by Davis, Rogers & Co., for $11,950.

David Gibbs has been awarded a contract for the plumbing, gas fitting and sewering of the Gendotti Estate Building at the corner of Octavia and Hayes Streets for $567.

The San Francisco Board of Public Works has invited bids for a metal covering for the dome and lantern of the new City Hall. Awards were made this week for the instruments and apparatus needed for the new Central Fire Alarm Station to the amount of $4.905.

The San Francisco Board of Supervisors has decided to erect an additional wing to the San Francisco Hospital at a cost of about $500,000 to be used as a tuberculosis department.

T. G. Smith, formerly of Niland, but recently of Los Angeles, has been visiting here looking over the field with a view to re-establishing himself in the plumbing business.

Other Cities in the State.

Bids are now being received for the plumbing and sewering required for the new cooking department at the Seventh Street School, Los Angeles.

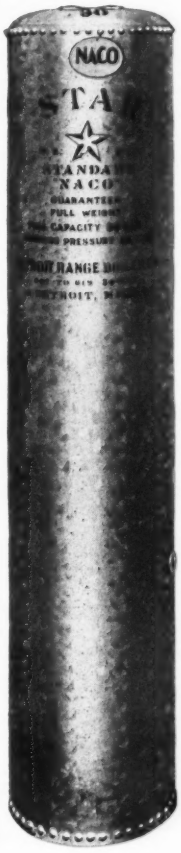
H. A. Stinson has bought out the plumbing stock and business of E. P. Webb, at Los Angeles.

The general contract for the thirteen-room Webster School at Fresno has been awarded to James L. Daly for $52,700; and the general contract for the Longfellow School to the Evans Contracting Company for $85,250. Plans have been accepted for the Washington School, and bids will be called for in the near future. Bids will be called for in a few days for the Fresno Normal School to be erected at a cost of $370,000. The plumbing and heating work have not yet been awarded.

Plans have been drawn and bonds have been voted for a new grammar school building to be erected at Colton, at a cost of about $80,000. The building will contain sixteen class rooms, an auditorium and departments for domestic science and sloyd work.

Martin I. Welsh, who until a year or two ago was a master plumber in Sacramento, this week received his commission as Superior Judge of Sacramento, to which position he was elected at the November election to fill an unexpired term. Mr. Welsh was admitted to the California Bar about two years ago.

What Is An Extra Heavy Range Boiler?



Now that isn't quite so foolish a question as it looks. Ask six range boiler manufacturers that question, and you probably will get six different answers.

Every manufacturer has his own idea as to what **extra heavy** means—and it will surprise you to find that to some of them "**extra heavy**" means about the same as "**standard**" does to us.

STAR NACO

Extra heavy Range Boilers are made to the extra heavy **NACO** specifications drawn by the National Committee. They are **real** extra heavy boilers—not **extra heavy** by virtue of a stencil alone.

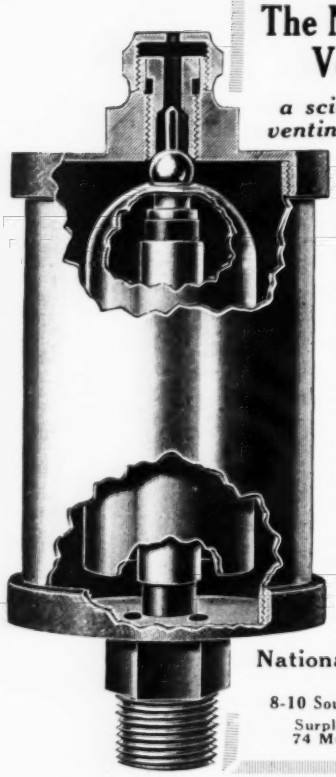
Size	Gauge of steel in shell	Gauge of steel heads and bottoms	Average Weight
30 gal. Extra Heavy	11 gauge	10 gauge	110 lbs.
40 gal. Extra Heavy	11 gauge	10 gauge	125 lbs.

You ought to know what you are getting when you pay for an extra heavy boiler. Do you?

Specify STAR NACO on all your range boiler orders, and thus be sure. There is no deception about them. Remember that they are *all riveted*, too.

If your jobber can't supply you, write to us for the name of one who can.

Detroit Range Boiler Co.
24th and E Streets
Detroit, Mich.



The National No. 10 Vent Valve—

a scientific device for venting mains of all air

Plumbers and Steam Fitters find the No. 10 VENT VALVE not merely satisfactory in service but **decidedly necessary** for use for Vapor Systems. It automatically vents Mains of all air—it prevents the escape of steam and water, etc.

These are only a few of its features, and when it is considered that it is a large and durably constructed valve that gives guaranteed service at all times—that it has an encased expansion post and large copper float with ball seat, one may form his own idea of how valuable the No. 10 VENT VALVE really is.

It is 7½ inches over all, with a ¾-inch connection.

Let us tell you more regarding its remarkable service—write.

National Steam Specialty Company
8-10 South Clinton Street, Chicago

Surpless, Dunn & Company,
74 Murray Street, New York

The Dole Packless Hot Water Valve

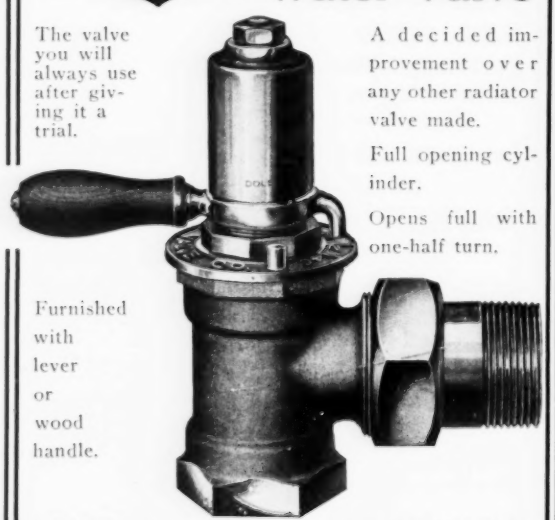
The valve you will always use after giving it a trial.

A decided improvement over any other radiator valve made.

Full opening cylinder.

Opens full with one-half turn.

Furnished with lever or wood handle.



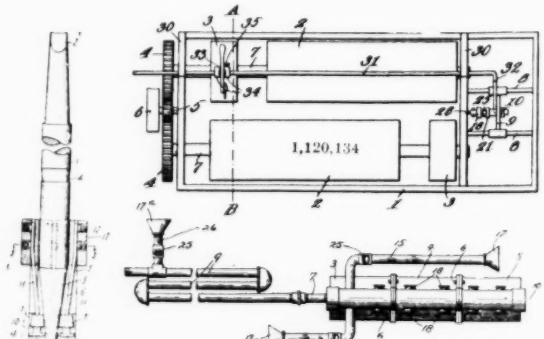
Position of lever handle and indicator shows exact degree of opening—a feature which appeals to every householder. Write for new literature and prices.

THE DOLE VALVE CO.
208 N. Fifth Ave., Chicago
Complete line of Standard Steam and Hot Water Radiator Valves

Heating Department.

1,120,100. Expanding-Head. Charles Sonneborn, West Pittsburgh, Pa., assignor to Pressed Metal Radiator Company, Pittsburgh, Pa., a corporation of Pennsylvania. An expanding device, comprising a head provided with an axial opening and having openings through its wall and longitudinal slots extending from said openings, rollers mounted in said openings for radial movement with their axes longitudinal of the head, spring arms secured in said head and lying in the longitudinal slots thereof and having their ends engaging the rollers, a collar rigidly secured to said head, set screws threaded through said collar and engaging said springs, and a tapered rotary spindle adapted to enter said head, contact said rollers, expand and rotate the same and revolve said head.

1,120,134. Machine for Trimming Pipes. Robert Emmett Connor, Owensboro, Ky. The combination with revoluble pipe supports and a stationary guide, of a cross head slidable along lines parallel with the supported pipe, a standard movable with the cross head, an arm shiftable with the standard and slidable within the guide, a cut-off knife adjustably mounted on said standard and movable therewith, and separate means movable with the standard for engaging the interior shoulder in the bell of the supported pipe so as to rotate with said pipe and for cutting off the issue within the bell at the shoulder, respectively.



1,120,100

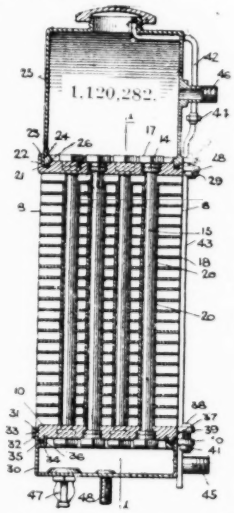
1,120,405.

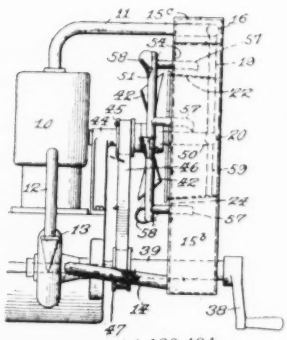
1,120,405. Purifier for Steam-Boilers. Harry H. Ralph, Philadelphia, Pa., assignor to Boiler Water Purifier Company, Philadelphia, Pa., a corporation of Delaware. A water purifier of the class recited comprising a hollow casing provided throughout its entire length with a series of openings, movable covers for some of said openings, pipes terminating in funnel-like extensions for other of said openings, a horizontal feed inlet for the casing and a baffle plate immediately adjacent the inlet and extending from the top of said casing to a point near the bottom thereof.

1,120,282. Radiator. Charles E. Clark, Douglas, Wyo. In a radiator, a member having a recess extending around the top of the member, there being a groove in the top of the member extending longitudinally thereof, a gasket in the recess, a second member having a tongue desposed in the groove, the second member being normally dis-

posed against the gasket and means for holding the second member in place.

1,120,404. Radiator. Andrew P. Olson, Chicago, Ill. In a device of the class described, a radiator casing providing an interior water collecting chamber and a water reservoir, a revolving water distributer communicating



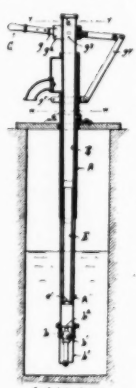


1,120,404.

with said reservoir and having air supply inlets whereby air and water are mixed in the distributer and also outlets to discharge the mixed air and water therefrom into the collecting chamber of the casing.

Plumbing Department.

1,119,801. Pump. Leo A. Brigel, Cheviot, Ohio. In a mechanism of the character described, a tubular body section, a valve cage having a tubular section telescopically united to the lower end of said body section and provided with a valve adapted to admit water to the lower end of said body section, an independent spout member having a tubular section telescopically united to the upper end of said body section, means attached to the exterior of said body section to adjustably support said body section upon a curb, a hollow displacement plunger closed at its lower end and at its upper end projecting above said body section and adapted to be reciprocated within said body section, and mechanism to reciprocate said plunger



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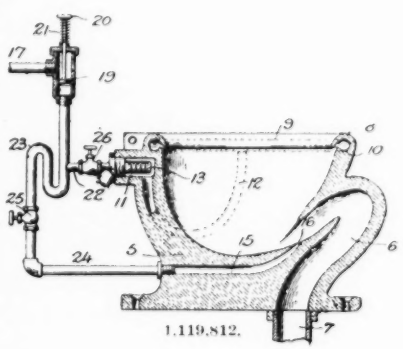


1,119,812.

clamped upon the exterior of said plunger above said body section and adjustable longitudinally of said plunger.

1,119,812. Water Closet. John A. Deignan and Henry J. Pollacek, New York, N. Y. In water closets, the com-

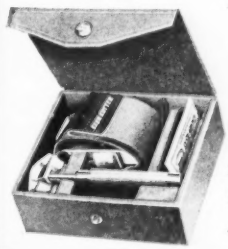
Gifts that are always welcome

Tiptop gifts—that's what these Keen Kutter pieces are—the blades in this Keen Kutter pocket knife have the stuff in them that holds a frost-sharp edge. The spring in the blades? *Fine.* The handles *will* stay on

KEEN KUTTER
Pocket Knives

No. K4283. Price $1.50 Pocket Knife 4 blades

You'll find, too, that a Keen Kutter Junior Safety Razor set will be appreciated as few gifts are. All Keen Kutter goods are sold with the understanding that they'll give satisfaction or the dealer is authorized to return the price.



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No. KJ107. Price $2.50. Keen Kutter Set:
1 Keen Kutter Junior Safety Razor.
1 extra package of blades.
1 Keen Kutter automatic stropper.
All in green karatol, plush-lined case.

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FACTORY TO PLUMBER

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American Valve & Tank Co.
Indianapolis, U. S. A.

As a safeguard against grease-clogged pipes, it will pay you to include the

BOSTON GREASE TRAP

in every kitchen sink installation you make.

Pipes CANNOT clog, as all grease is caught and retained in the BOSTON Trap.

The BOSTON Trap is easily and quickly cleaned and always gives satisfaction.

Write for prices and interesting discounts.

R. ESTABROOK'S SONS
1st and C Streets, SOUTH BOSTON MASS

the VAPOR SYSTEM Economical
Easiest, quickest, cheapest. Turn any steam heating system, old or new, into a perfect Vapor System with KOALSAVE VACUUM
PARK ROW BLDG.
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Write to-day for full information
VALVE COMPANY
NEW YORK

Guaranteed Water Heaters
RUUD Instantaneous Automatic Water Heaters
RUUD Automatic Cottage Water Heaters
6 distinct types and numerous sizes
Write us about them.
RUUD MFG. CO., Main Office, Pittsburgh, Pa.

GUARANTEED SIX YEARS
THE "COY-DEL" SEAT is the most satisfactory seat on the market from every standpoint.
Made from 1½ inch quartered oak.
All joints tongued and grooved—held firmly together by two rustless steel rods.
Write for particulars.
COYNE & DELANY CO. Brooklyn, N. Y.

"BUCKEYE" DIE STOCKS
"Easy Cutters" for pipe 1-2 inch in diameter and larger
"DUPLEX" DIE STOCKS
For all pipe from 1-8 to 4 inches
THE HART MFG. CO., 2313 E. 20th St., Cleveland, U. S. A.

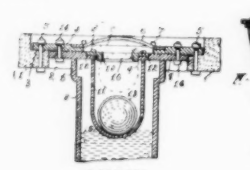
"IN UNION THERE IS STRENGTH"
For a closet seat with great strength and extra long life, recommend and install the
UNION GUARANTEED SEAT
It bears the Union Gold and Blue Label—look for it.
M. P. BERGLAS MFG. CO., Fulton and Furman Streets., BROOKLYN, N. Y.

"A NEAT FLANGE"
—
MODERN
IRON WORKS
QUINCY ILL.

bination with a bowl having a gutter in its rim, a muffler chamber and passages in its wall comprising trapped side communications between the muffler chamber and the gutter in the rim of the bowl and a trapped inlet nozzle at the bottom of the bowl, of a muffler in the muffler chamber, water supply pipes for the muffler and the inlet nozzle, and a valve controlling the supply pipes.

1,119,895. Sewer Pipe Valve. Richard R. Stielow, Neenah, Wis. In combination with a sewer pipe having a flanged upper end extending upward into the floor of a cellar, of a plate formed with a centrally arranged circular opening above said flanged end and adapted to be secured to said floor, a second plate having a centrally arranged opening, mounted over and upon the sewer pipe and concentrically with the opening in the first named plate and secured upon the lower side thereof, a rabbeted seat formed around the central opening in said second named plate, a valve cage integral with, and depending from said second named plate, a floatable valve supported within said cage and a ring plate having a valve seat upon its lower side, secured within said rabbeted seat of the second named plate.

1,119,909. Combined Backwater-Trap and Floor-Drain. William S. Walling, Kansas City, Mo., assignor to Crampton-Farley Brass Company, Kansas City, Mo., a corporation of Missouri. A floor drain and back water trap, comprising a receptacle having at a suitable height above the bottom a discharge stem, a partition depending into the receptacle to a plane below the lower side of said discharge stem, a second perforated partition connecting the first-named partition with the wall of the receptacle below the lower side of said stem, and a valve closing said perforation in the second partition and controlling communication between said receptacle and the discharge stem.



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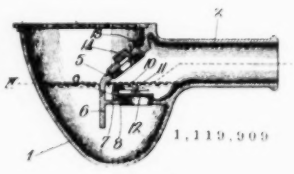

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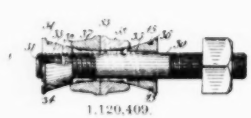

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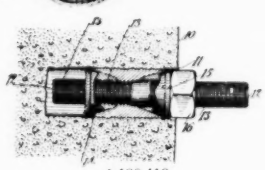
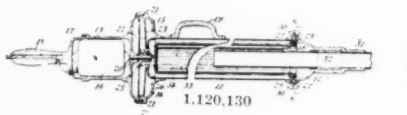


1,120,410

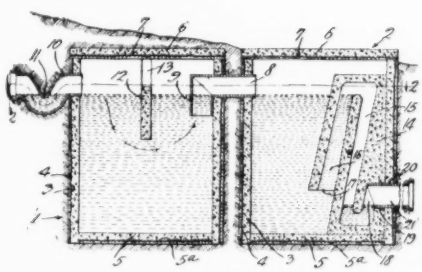
1,120,409. Expansion-Bolt. Gabriel E. Rohmer, Woodside, N. Y., John Francis Booraem, Greenwich, Conn., and Ralph Morley, Brooklyn, N. Y., assignors to the Booraem & Rohmer Patent Company, a corporation of New York. In an expansion bolt, expanding members, expansible members of a material capable of being molded, engaged by said expanding members, and a bolt proper detachably connected with one of said expanding members, said expanding members being provided with locking formations to be engaged by the expansible members, capable of being molded thereon to preserve their connection when the bolt proper is removed.

1,120,410. Method of Anchoraging. Gabriel E. Rohmer, Woodside, and John Francis Booraem, New York, N. Y., assignors, by mesne assignments, to Cinch Expansion Bolt & Engineering Company, New York. In the art of anchoring a bolt in a hole in a wall in which an expanding member whose greatest diameter is substantially that of the hole and which is held against longitudinal movement on

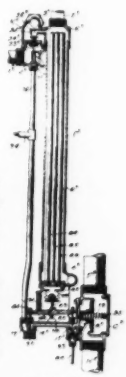
the bolt, engagingly enters into an expansible member, said expansible member being intermediate the expanding member and the wall of the hole, and being expanded and pressed outwardly against said wall by the expanding member, that step which consists in spreading the area of application of the expanding force, from the portion to which it is initially applied, to consecutive portions of the expansible member, said expanding force pressing the entire expansible member outwardly against the wall only at the completion of the expansion.



1,120,130



1,120,351



1,120,571

1,120,130. Vacuum Cleaning-Machine. Secondo L. Casella, New York, N. Y. In a pneumatic cleaner, an elongated dust filter bag having its longitudinal walls formed in folds or plaits longitudinally arranged about an unrestricted interior so as to provide a single undivided dust chamber with walls largely increased in surface area.

1,120,351. Septic Tank for Sewage Disposal. Thomas Isaac Weston, Columbia, S. C. In a device of the character described, a discharge chamber having an upper inlet, an upright siphon block disposed within the chamber and fitting one wall thereof, the siphon block having an upright passage, an inlet arm leading from the upper end of the said passage and terminating above the bottom of the chamber, an upturned discharge arm extending from the lower end of the passage, and an opening at the end of the said discharge arm, and the said wall of the chamber having an opening registering with the said opening, and an outlet pipe fitting in said openings.

1,120,571. Water-Heater Construction. Frank L. O. Wadsworth, Sewickley, Pa. In an automatic water heater, a burner, a gas valve for controlling the supply of gas to the burner, a member actuated by the differences of water pressure caused by opening and closing the outlet from the heater, a thermostatic means operated by the heater water, means actuated by fluid pressure for operating the gas valve, and two valves for controlling the application of the fluid pressure to the power controlled means arranged in series in the line of flow of such fluid pressure, one of such valves being operated by the water-actuated member and the other of such valves being operated by the thermostatic means, and the first of said two valves being arranged to cut off the application of the fluid pressure when the outlet from the heater is closed, and the second of such valves being arranged to permit the application of the fluid pressure when the heater water is below a predetermined temperature for which the thermostatic means is set, and the first valve is open.

Daniel J. McCluskey, a master plumber of Waltham, Mass., has filed a petition in bankruptcy.

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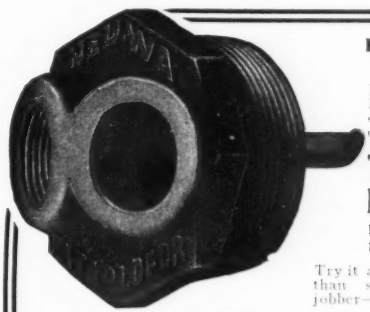

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WANTED—PLUMBERS SPECIALTY salesman for Michigan; also one for Iowa. Do not reply unless you are experienced and furnish references with your first reply. 12-19, 26; 1-2

WANTED—EXPERIENCED RADIATOR and boiler salesman. One well acquainted with Chicago architects, engineers and heating trade preferred. Address 1195, care "Domestic Engineering," Chicago. 12-19, 26; 1-2

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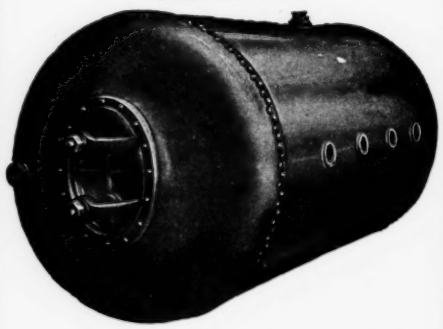

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